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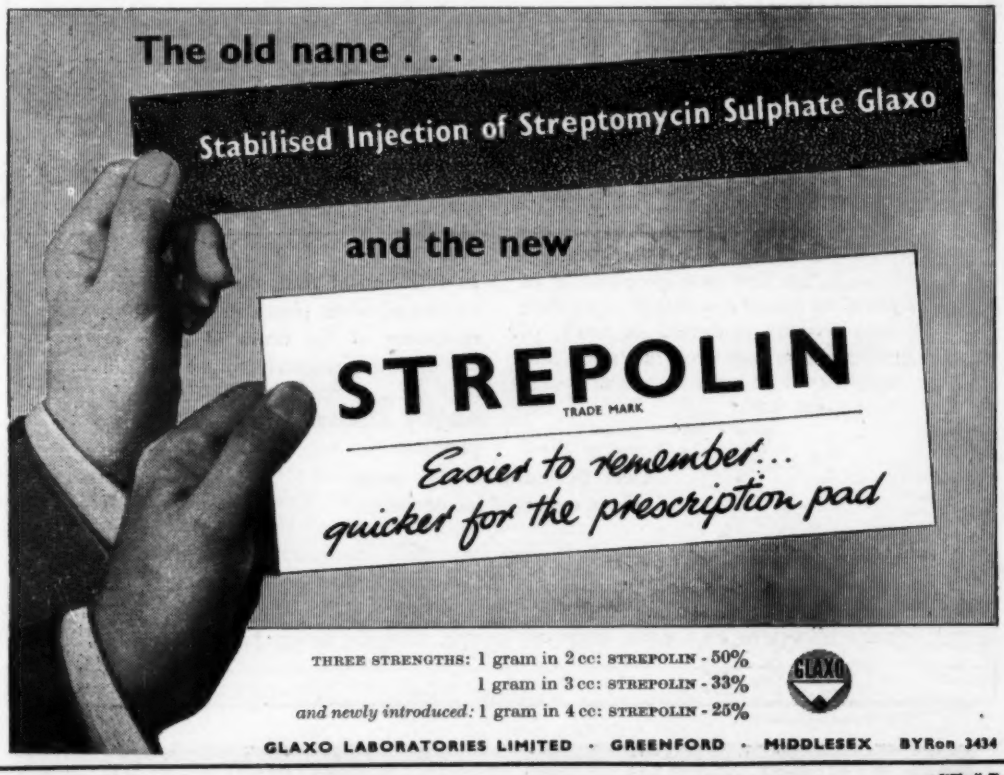

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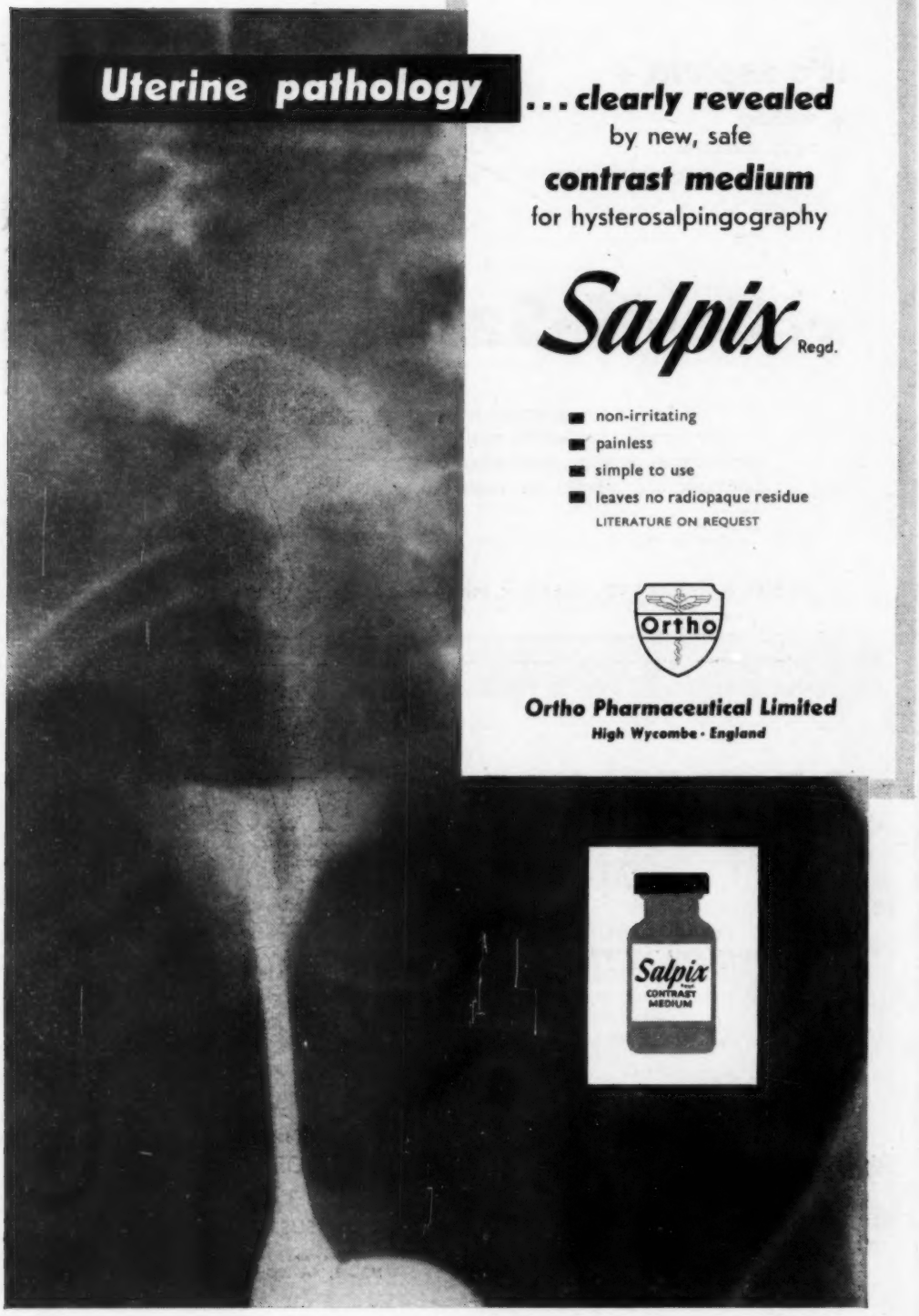
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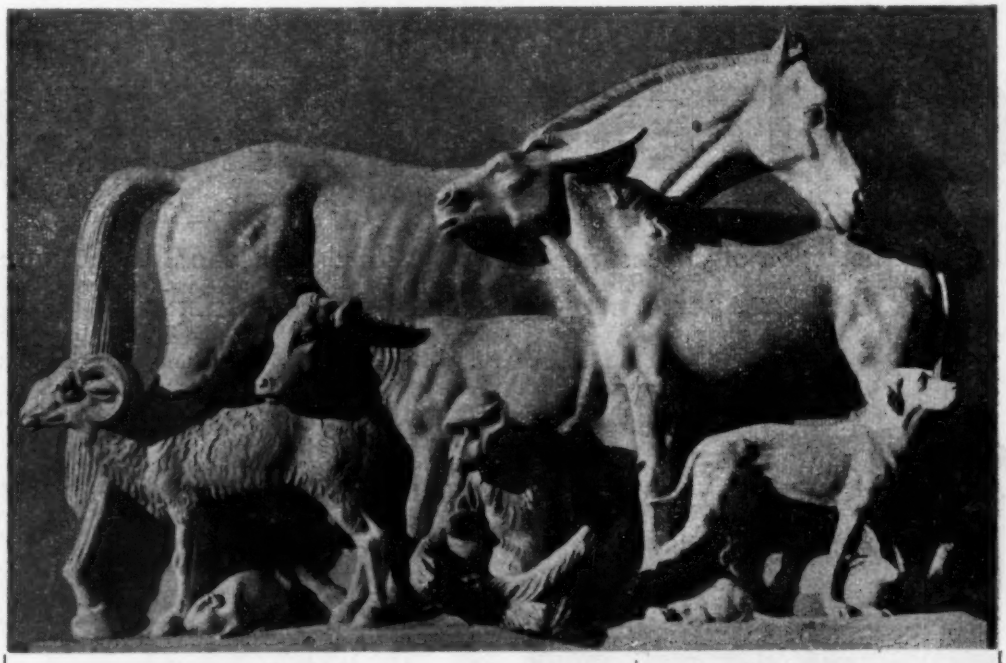

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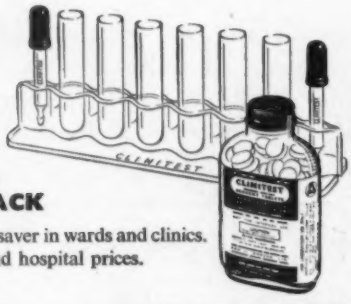
Approved by the Medical Advisory Committee of the Diabetic Association. The 'Clinitest' set, refills and accessories are all available under the N.H.S. on Form E.C.10. (*Basic Drug Tariff Prices: Set 6/8 complete. Refill bottles of 36 tablets 2/4.*)



CLINITEST HOSPITAL PACK

An invaluable time-saver in wards and clinics. Write for details and hospital prices.

The advantages of ACETEST Reagent Tablets

Quick and reliable, a single tablet provides all the reagents to perform a test. Low cost permits this tablet test to be used as a screening procedure or as a routine for diabetic patients. No danger of false positives with normal urine. No caustic reagents.

TO PERFORM A TEST:

1. **Put 1 drop of urine on tablet.**
2. **Take reading at 30 seconds. Compare tablet to colour chart provided.**
3. **Record results as negative, trace, moderate or strongly positive.**

Supplied in bottles of 100 *tablets with colour scale.*

'Acetest' Reagent Tablets (*diagnostic nitroprusside tabs.*) are also available under the N.H.S. on Form E.C.10. Basic Drug Tariff price 3/10 per bottle of 100 tablets (with colour scale).

REFERENCES

(1954) 'Clinical Tests for Ketonuria', *'Lancet', April 17th, pp. 801/804*

(1954) '*Medicine Illustrated*', *May, p. 289*

(1954) '*Practical Clinical Biochemistry*', *Heinemann, p. 74*

(1954) 'Clinical Tests for Ketonuria', *'Lancet', July 10th, p. 95*

AMES COMPANY (LONDON) LTD.

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In keeping with the times

In our Forefathers' Age scientific study and investigation were made possible to the Physician only by consultation - often difficult - of a few original codices or the rare reproductions of manuscripts to be found in the more famous Libraries.

Today an advance-guard Pharmaceutical Industry provides full assistance to the Physician also in the documentary field, placing at his disposal not only the extensive literature dealing with its own therapeutic progress, but a wealthy and up-to-date library equipped with thousands of scientific publications from which individual works or extracts can be drawn by modern methods of reproduction.

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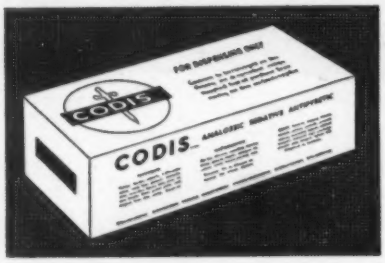
Codis and the Physician

THE ADVANTAGE OF "CODIS" to the physician is this.

Like Tab. Codein. Co. B.P., Codis offers the valuable and tried combination of aspirin, phenacetin and codeine phosphate. But the aspirin in Codis, unlike that in Tab. Codein. Co. B.P., is in the form of soluble calcium aspirin—which is formed immediately the tablet is dissolved in water. This calcium aspirin is of course far less likely to cause the gastric irritation sometimes produced by acid particles of ordinary aspirin.

Because it is more readily soluble, Codis will be found easier to administer—and the aspirin it contains will be rapidly absorbed by the patient.



COMPOSITION

Each Codis tablet contains:—Acid. Acetylsalicyl. B.P. 4 gr.; Phenacet. B.P. 4 gr.; Codein. Phosph. B.P. 0·125 gr.; Calc. Carb. B.P. 1·2 gr.; Acid. Cit. B.P. (Exsic.) 0·4 gr.

Codis (Regd.) is not advertised to the public

FOR PRESCRIPTION. Codis is available in distinctive gold foils of 6 tablets each.

PUBLIC SIZES. 20 tablets (in bottles or foil) 2/7 each, inc. P.T.

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DALZOBAND MEDICATED BANDAGES

These are an Unna's paste type bandage that are always moist–always ready to use. The medicated bandages are loosely wound round the affected part and covered with another dry bandage tightly applied. There are five varieties of Dalzoband, all of which conform to the N.H.S. specification for such bandages in the Drug Tariff issued by M.O.H.

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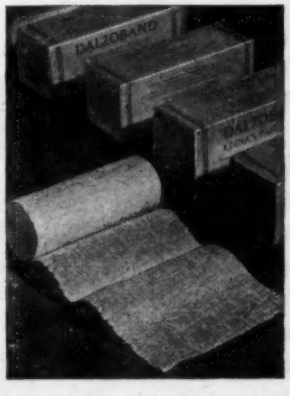

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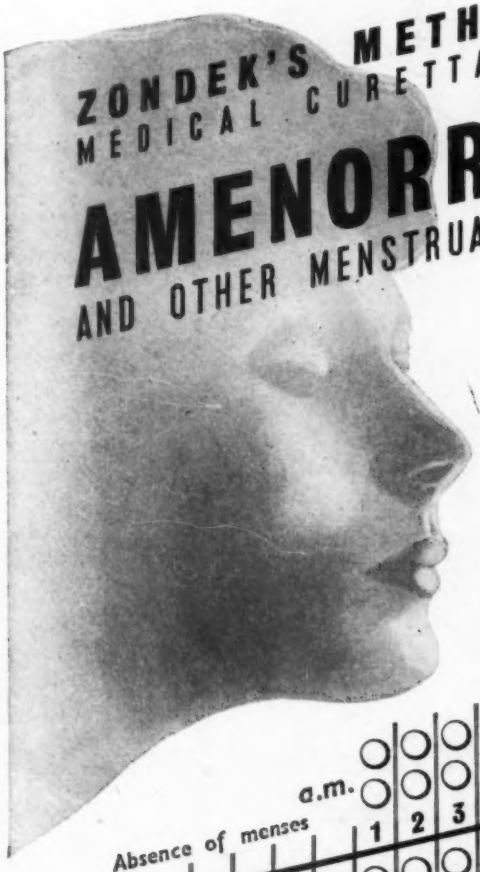
AND OTHER MENSTRUAL DISORDERS



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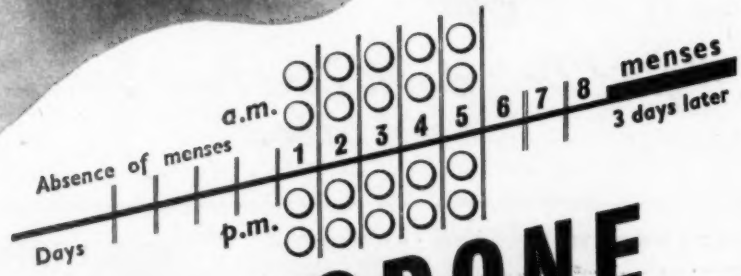

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Each Tablet contains Ethisterone 10 mg. Ethinyl Oestradiol 0.01 mg.

Box of 20 Tablets intended for a 5-day course
BASIC N.H.S. COST 8/6

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which qualify **HYPON TABLETS** *as a leading Analgesic and Antipyretic*

1 **Analgesic and Antipyretic:** Indicated for the relief of pain associated with Rheumatism, Spastic Dysmenorrhœa, Neuralgia, Headaches and all conditions which call for a balanced Analgesic and Antipyretic.

2 **Rapidly effective:** Quickly absorbed and easily assimilated. Rapid disintegration ensuring quick relief from pain and maximum therapeutic value.

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+two more...

4 **Non-depressive:** Distressing side effects normally associated with administration of aspirin, phenacetin and codeine are counteracted by a therapeutic dose of caffeine.

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FORMULA: *Acid.. Acetylsalicyl B.P.—40.22%; Phenacet. B.P.—48.00%; Caffein. B.P.—2.00%; Codeine Phosph. B.P.—0.99%; Phenolphthal B.P.—1.04%; Excip.—7.75%* (*each tablet 8 grains*)

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DOUBLE-BARRELLED

The value of combining penicillin with 'Sulphamezathine' in the treatment of serious bacterial infections has been confirmed by clinical experience — 'Sulmezil' now enables this to be done in the simplest and most convenient way.

THE ADVANTAGES OF 'SULMEZIL'

- **Enhanced antibacterial effect**
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'SULMEZIL' ORAL SUSPENSION contains 0.5 gramme 'Sulphamezathine' Sulphadimidine B.P. and 150,000 units 'Dibencil' benzathine penicillin, in each fluid drachm (3.5 c.c.). Ready for use, the Suspension is pleasantly flavoured, and free from the characteristic taste of either penicillin or sulphonamide. It is therefore particularly suitable for children. 'SULMEZIL' TABLETS are also available, containing the same dosage.

'Sulmezil'

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ORAL SUSPENSION AND TABLETS

COMBINED 'SULPHAMEZATHINE' AND PENICILLIN THERAPY

IMPERIAL CHEMICAL (PHARMACEUTICALS) LIMITED

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There are buffers and buffers

—but Prodexin has all the attributes of a *true* buffer,* and more besides:

1
It keeps gastric acidity down to an equable level (*p*H 3·5 to 4·5).

2
It does not alkalise the stomach contents, so that acid rebound cannot occur.

3
Its effect is consistent and prolonged.

4
It does not vary in potency.

5
It is pleasant and safe to take, conveniently packed and is not extravagant to prescribe.

**Reference:*
Practitioner, 173: 46, 1954

PRODEXIN reliably controls

HYPERACIDITY & PEPTIC ULCER

Formula

Aluminium glycinate .....0·9 gm
Magnesium carbonate .....0·1 gm

Packages

Cartons of 30 individually wrapped tablets.
Dispensing packs of 240 tablets.

C. L. BENCARD LTD. PARK ROYAL, LONDON, N.W.10

Sleep... the healer

NO single barbiturate combines rapid onset with a duration of action sufficient to ensure a whole night's restful sleep. Carbrital capsules, however, contain pentobarbitone sodium (a quick acting barbiturate) and carbromal (a mild sedative). This, plus the fact that there are little or no after-effects, makes Carbrital ideal for all types of insomnia and for use as a general sedative.

CARBRITAL

for all types of insomnia

available in bottles of 25 and 250 capsules

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Rapid Relief from Pain

The active principles in a Veganin tablet are bound together by an excipient which causes rapid disintegration, allowing therapeutic results to be achieved in a matter of minutes. The purpose of this high speed disintegration is to bring rapid relief from pain — and this is the primary function of Veganin. The tablet contains acetylsalicylic acid, phenacetin and codeine; they act together to allay pain, lower the temperature and induce a state of relaxation.

ACTIVE CONSTITUENTS: *Each tablet contains 250 mg. acetylsalicylic acid, 250 mg. phenacetin, 10 mg. codein phosph.*
PACKING: *Tubes of 10 and 20 tablets. Dispensing packs of 100 at 5/9d. and 500 at 25/- (not subject to P.T. on prescription).*

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No Warner preparation has ever been advertised to the public.
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Transvasin

brings the esters of NICOTINIC ACID SALICYLIC ACID p-AMINOBENZOIC ACID to the focal point of soft-tissue rheumatism

The esters in Transvasin, a new preparation developed by Hamol S.A., our Swiss associates, readily pass the skin barrier in therapeutic quantities and enable an effective concentration of the drugs to be built up where they are needed. Transvasin not only induces vasodilation of the skin with a superficial erythema, but also brings about a deep hyperaemia of the underlying tissues. It is non-irritant, and can be safely used on delicate skins. It is now being widely prescribed, with successful clinical results. Since a very small quantity is sufficient for each application, the cost of treatment is extremely low.

Salicylic acid tetrahydrofurfuryl-ester	14%
Nicotinic acid ethyl-ester	2%
Nicotinic acid n-hexyl-ester	2%
p-Aminobenzoic acid ethyl-ester	2%
Water-miscible cream base ad	100%

Transvasin is available in 1 oz. tubes, basic price 2/6 plus 7½d. P.T., and is not advertised to the public. Samples and literature will be gladly sent on application.

LLOYD-HAMOL LTD., 11 WATERLOO PLACE, LONDON, S.W.1. WHITEHALL 8654/5/6

Transvasin is the registered trade mark of Lloyd-Hamol Ltd.

The manifestations of a functionally disordered gastro-intestinal tract, agonising at their worst, are at their least a source of social embarrassment which can be distressing in the extreme. Busy people, who must often go long hours without time for food, have good reason to hail the advent of an effective anti-spasmodic which will, in more senses than one, quieten their yearning bowels.

MERBENTYL

distributed in the United Kingdom & Eire by
RIKER LABORATORIES LIMITED, LOUGHBOROUGH, LEICS.
for the Wm. S. Merrell Company, London.

MERBENTYL *Tablets each containing 10 mg. Diethylaminocarbethoxybicyclohexyl hydrochloride.*
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Each in bottles of 50 and 250 tablets. The basic N.H.S. cost of treatment is less than 5d. a day.

Merbentyl Plain and Merbentyl with Phenobarbitone (each 5 c.c. containing 15 mg. Phenobarbitone) are also available in Syrup form.

OVER WORKED
FEARFUL
NERVOUS
TENSE
ANXIOUS
RESTLESS
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a New Experience in

TRANQUILLITY

For anxious, tense, restless patients Seconesin provides a safe relaxant-sedative. It introduces a totally new idea in sedation. Non-narcotic and with a minimum of secobarbital, there is no danger of cumulation or "hangover" because both components are rapidly eliminated. Seconesin acts promptly and its effect lasts for a few hours only. Day-time relaxation with Seconesin is so calming that most patients sleep well at night without further hypnotics or sedatives. Each tablet contains :–Mephenesin 400 mg. Secobarbital 30mg.

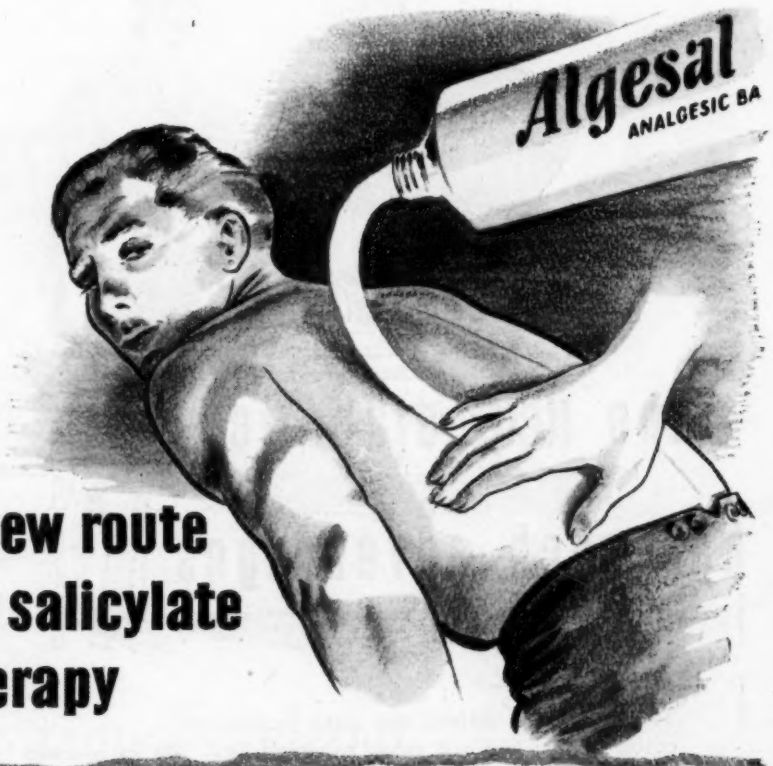
SECONESIN

TRADE MARK

Packings : Bottles of 25, 100 and 500 tablets

Full literature on request.

THE CROOKES LABORATORIES LIMITED · PARK ROYAL · LONDON N·W·10



A new route for salicylate therapy

Algesal balm has only one active principle, the newly-synthesised compound, diethylamine salicylate, which differs from other salicylates in that it is *not* a counter-irritant nor a rubefacient.

Diethylamine salicylate has been shown to penetrate the skin in significant quantities and this discovery has opened up a new route for salicylate therapy.

The site of action of salicylates taken by mouth is still not known for certain and some authorities suggest that it may be peripheral, at the site of the pain[1]. Percutaneous salicylate therapy thus has immense possibilities, and Algesal is proving to be a most valuable remedy for the relief of local tissue pain by inunction.

The indications for Algesal fall naturally into four groups: rheumatism, closed inflammatory conditions, pain following trauma of different kinds, and certain painful conditions of unknown aetiology — e.g., chilblains and idiopathic night cramps.

Algesal is a non-staining white cream with a pleasant smell of lavender. It contains 10% diethylamine salicylate, in a vanishing cream base specially formulated to assist skin penetration.

Samples and literature will gladly be sent on request to the manufacturers, E. G. H. Laboratories Ltd., Peru Street, Adelphi, Salford 3.

[1] Practitioner, (1953) 170, 515.

Algesal

E.G.H. LABORATORIES LTD., PERU ST., SALFORD 3, LANCS

the *new* diabetic has such advantages

To-day, the new diabetic has many facilities to enable him to lead and enjoy a normal life. The introduction of I.Z.S. (Insulin Zinc Suspension) A.B. has greatly simplified the treatment of the majority of cases, one injection being sufficient to control the blood-sugar level for 24 hours.

I.Z.S. offers the following advantages over other prolonged action insulin preparations :—

1. No protein or peptide material present other than insulin itself.
2. Rapid onset with prolonged action.
3. It meets the needs of a higher percentage of diabetics.

I.Z.S. (Insulin Zinc Suspension) A.B. is supplied in vials of 10 c.c. containing 40 or 80 units per c.c.

Insulin Zinc Suspension 'AB'

A|B

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A case for RAUWILOID + VERILOID . . . .

RAUWILOID + VERILOID

RAUWILOID + VERILOID is a striking example of drug complementation. It combines in one tablet 1 mg. of 'Rauwiloid' brand alkaloid hydrochlorides of *Rauwolfia serpentina* and 3 mg. 'Veriloid' brand alkaloids of *Veratrum viride*. 'Rauwiloid', by widening the margin between the effective therapeutic dose of 'Veriloid' and that producing side actions, enables satisfactory hypotensive doses of 'Veriloid' to be given to most patients. The combination is ideal for relieving the symptoms of moderate to severe hypertension. It is effective, safe, produces a minimum of discomfort to the patient and exerts a prolonged antihypertensive action.

"The addition of 'Rauwiloid' makes 'Veriloid' easy to administer, more effective and practically does away with unpleasant side reactions".

See *Amer. J. Med.*, (1954) 17 : 629.

Available in Bottles of 100 and 500 Tablets

RIKER

'RAUWILOID' and 'VERILOID' are Registered Trade Marks: Regd. Users:

RIKER LABORATORIES LIMITED

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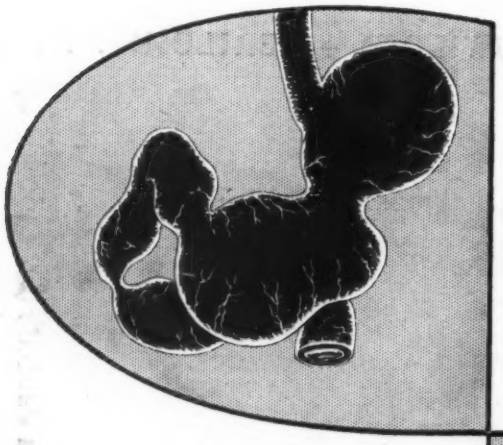

The potent anticholinergic agent for Gastric Hypermotility

The proven value of "Pro-Banthine" lies in its high potency as an anticholinergic agent inhibiting transmission of neural stimuli at autonomic ganglia and parasympathetic myoneural junctions. By such inhibition "Pro-Banthine" reduces gastro-duodenal hypermotility, which is one of the causes of ulcer pain, and it is in striking confirmation of this that dosage with "Pro-Banthine" dramatically results in relief of pain.

SEARLE

Pro-Banthine* **BROMIDE**

brand of Propantheline Bromide

"Pro-Banthine" is safe, easily administered, and devoid of unpleasant taste. Pain relief and marked improvement is felt in most cases in 48 to 72 hours after starting "Pro-Banthine" treatment. Dosage is usually 15 to 30 mg. q.i.d. "Pro-Banthine" is supplied in 15 mg. tablets in bottles of 40, 100 and 1,000.

Literature on request.

SEARLE

Ethical Pharmaceuticals since 1888

G.D. SEARLE & CO. LTD.

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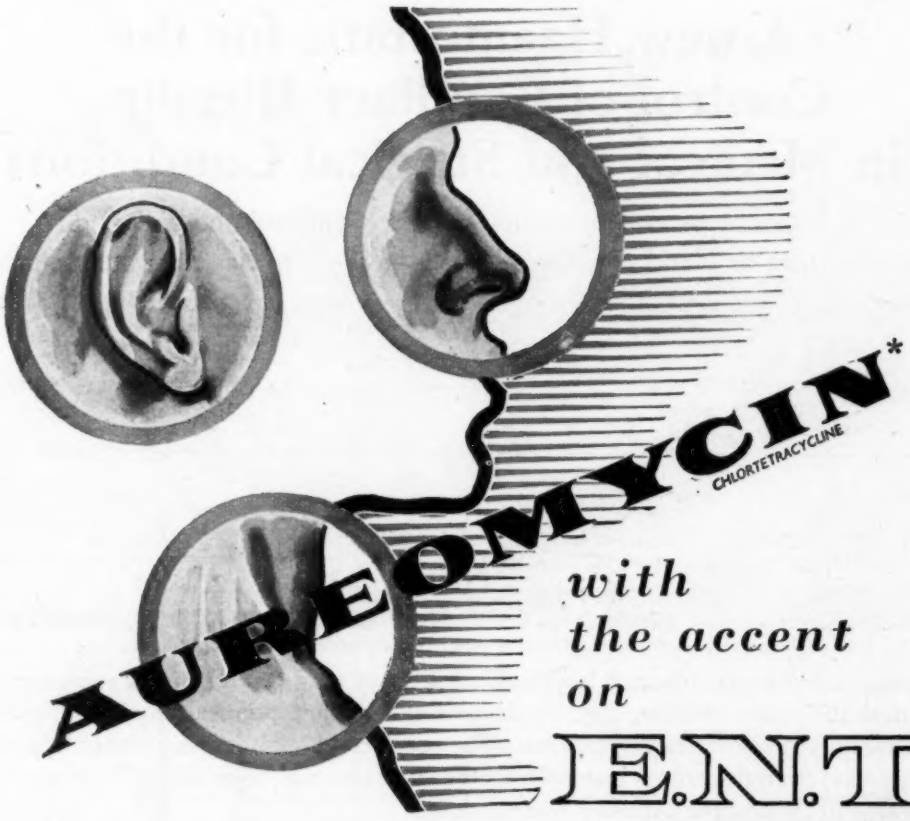

Especially notable among the merits of AUREOMYCIN is the ease with which effective concentrations can be produced *precisely where they are needed.* This feature is well demonstrated in the case of ear, nose and throat infections—the majority of which show prompt and positive response to this most versatile antibiotic.

In severe conditions, AUREOMYCIN is wisely given in capsule or soluble tablet form, to secure a rapid concentration in the tissues. And this measure is ably supported by appropriate local therapy such as AUREOMYCIN Otic, for instillation into the auditory canal . . . AUREOMYCIN Troches, which furnish a continuous bacteriostatic lavage of the mouth . . . or AUREOMYCIN Nasal, which swiftly arrests a wide variety of infections of the upper respiratory tract.

PACKAGES : CAPSULES (50 mg.), bottles of 25 and 100; 250 mg., bottles of 16, 100 and 1,000: SOLUBLE TABLETS (50 mg.), bottles of 100: OTIC, vial of 50 mg. with 10 cc. vial of diluent and dropper: TROCHES (15 mg.), bottles of 25: NASAL, vial of 10 mg. with 10 cc. vial of vasoconstrictor and dropper.

AUREOMYCIN *shows true economy at 1 Gm. daily dose*

Available also in the following forms : DENTAL CONES • DENTAL PASTE • INTRAVENOUS† • OINTMENT • OPHTHALMIC • OPHTHALMIC OINTMENT • ORAL DROPS • SPERSOIDS* *Dispersible Powder* • SYRUP • VAGINAL POWDER

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Lederle

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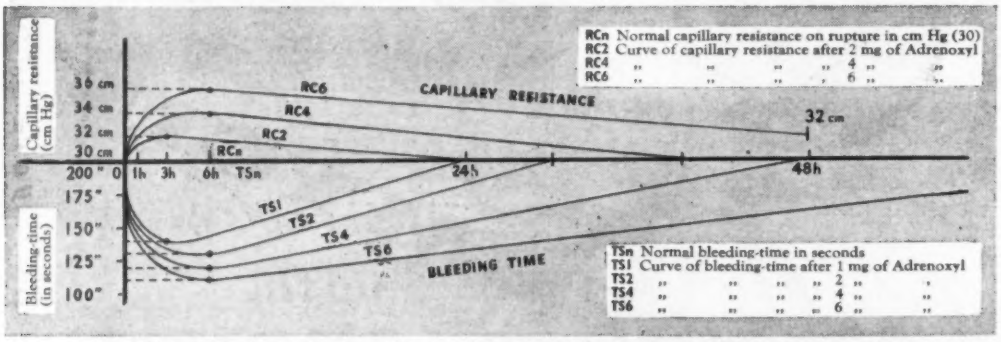
Cyanamid Products Ltd.

BUSH HOUSE • ALDWYCH • LONDON, W.C.2 • TEMPLE BAR 5411

A new Haemostatic for the Control of Capillary Bleeding in Medical and Surgical Conditions

Clinically proven to reduce bleeding-time without effect on coagulation or blood pressure, and to have no undesirable side effects



This graph gives dramatic evidence of the effect of Adrenoxyl on capillary resistance and bleeding-time

During recent years, research has been carried out on a new chemical substance that reduces the mean bleeding-time by decreasing capillary permeability and increasing contractility and capillary resistance. The product of this original research is called Adrenoxyl (adrenochrome monosemicarbazone) and has been clinically proven to be of value in controlling capillary haemorrhage.

ADRENOXYL has no effect on coagulation. It neither increases nor decreases blood pressure.

ADRENOXYL is non-toxic, and there are no contra-indications to its use.

ADRENOXYL is indicated in the preventive and curative treatment of all types of capillary bleeding.

ADRENOXYL has been successfully used for the control of capillary bleeding in a wide range of surgical operations, and has proved particularly useful in ear, nose, and throat surgery, ophthalmic surgery, thoracic surgery, gastro-intestinal surgery, plastic surgery, and urogenital surgery.
It has also been used successfully in many medical conditions associated with capillary haemorrhage or where capillary fragility is a feature.

ADRENOXYL may be administered by mouth or by subcutaneous or intramuscular injection. The oral form is for routine treatment, though when rapid action is desired the intramuscular route is recommended.

ADRENOXYL is now available in boxes of 6 or 50 ampoules: tubes of 25 tablets or bottles of 500 tablets.

HORLICKS LTD.
Pharmaceutical Division, Slough, Bucks.
Adrenoxyl is the Registered Trade Mark of the Société des Laboratoires Labaz

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C.R. Soc. Biol. 1944, **138**, 875.

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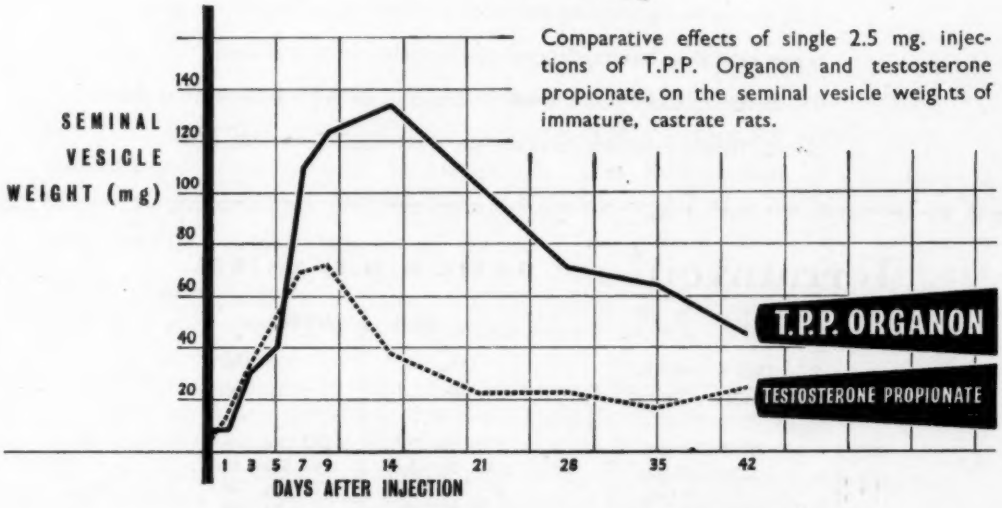
A NEW MALE HORMONE ESTER

T.P.P.-Organon

TESTOSTERONE PHENYL PROPIONATE



Comparative effects of single 2.5 mg. injections of T.P.P. Organon and testosterone propionate, on the seminal vesicle weights of immature, castrate rats.

- LONGER ACTING AND MUCH MORE POTENT THAN TESTOSTERONE PROPIONATE
- FEWER INJECTIONS REQUIRED
- TREATMENT SIMPLIFIED
- COST LOWERED

Indicated in conditions where testosterone propionate has hitherto been employed, T.P.P. Organon is presented for subcutaneous injection, in the following strengths—10 mg. per c.c. and 50 mg. per c.c.
Packs: 3 x 1 c.c. ampoules . 1 x 5 c.c. vials.

Literature on request

ORGANON LABORATORIES LTD
BRETTENHAM HOUSE, LANCASTER PLACE, W.C.2
Telephones: TEMple Bar 6785-6-7, 0251-2 Telegrams: Menformon, Rand, London

New antibiotic plant at Sandwich

Terramycin Prices Reduced

Built during the past year the new plant of Pfizer Ltd. at Sandwich in Kent is now producing Terramycin and other antibiotics on a large scale.

The immediate effect of this British Manufacture on Terramycin prices is given below. These greatly reduced prices take effect from March 14th, 1955.

Terramycin* — BRAND OF OXYTETRACYCLINE

BASIC N.H.S. PRICES

	OLD	NEW
Oral Suspension	16s. 10d.	12s. 0d.
Paediatric Drops	10s. 0d.	8s. 2d.
TABLETS		
1,000×250 mg.	£99 6s. 8d.	£93 9s. 2d.
100×250 mg.	£10 5s. 8d.	£9 13s. 6d.
16×250 mg.	£1 14s. 4d.	£1 12s. 2d.
100×100 mg.	£4 12s. 8d.	£4 9s. 4d.
25×100 mg.	£1 4s. 2d.	£1 3s. 8d.
100× 50 mg.	£2 8s. 10d.	£2 5s. 0d.
25× 50 mg.	12s. 8d.	12s. 0d.
Topical Ointment 1 oz.	9s. 9d.	9s. 2d.
Ophthalmic Ointment	1s. 6d.	1s. 4d.
Soluble Tablets	13s. 2d.	11s. 8d.

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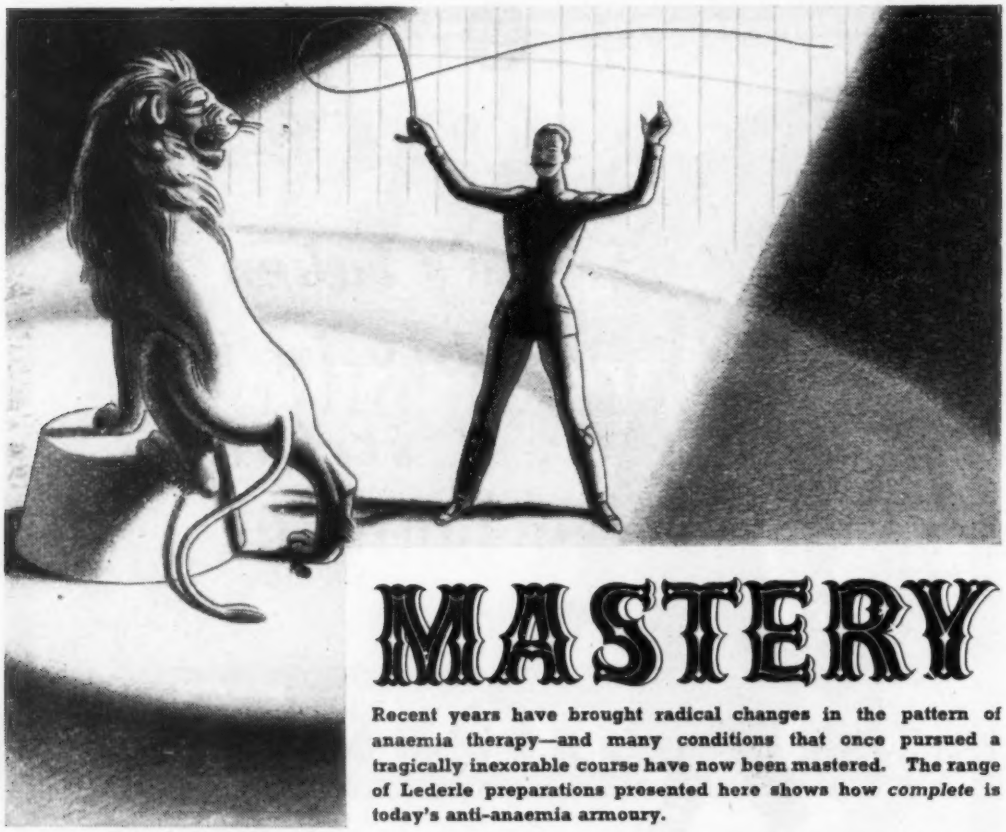

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INSTINCT AND THE NURSING COUPLE

MAVIS GUNTHER
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ALTHOUGH survival of the human race through the processes of evolution must have depended on successful feeding from the breast, there can be no doubt in the minds of those taking care of modern Western European and American women during the puerperium that instinct does not inform the mother how to feed her first baby. Many mothers are aware of this failure, which, if they think about it, is all the more remarkable since labour, which is part of the same job, is most effectively compulsive. The mothers sometimes secretly believe that they must lack innate maternal feeling and they are distressed by this apparent inadequacy.

Middlemore (1941) has pointed out that some chimpanzees when delivered in captivity have also not known what to do with their newborn babies. In fact the first two chimpanzees born in captivity (Reid Blair 1920) died of starvation without ever getting on the breast. Two others were successfully fed after the keepers had taught the mothers how to suckle, but one chimpanzee refused to have anything to do with her infant (Budd et al. 1943, Wyatt and Vevers 1935). When a female chimpanzee cannot rear her young without having a human male to teach her, instinct in the mother may indeed be said to have failed. One chimpanzee, Sally, who knew how to feed her infant, had, unlike the others, come to captivity relatively late in life, at about the age of 3 years (roughly equivalent to 6 or 7 in humans).

One explanation of this failure could be that in primates and man mimicry takes the place of instinct. Presumably the chimpanzee Sally had lived in a colony and seen suckling practised. In humans the small size of present-day families, and the conventions of modesty, combined with housing which allows privacy, have ensured that most women do not as children watch a baby being suckled. In London it is rare for more than one in ten primigravidæ to have seen an infant feed from the breast—far less to have an easy familiarity with the process from frequent watching.

Whatever the explanation of failure of this instinct in women, there is no doubt that feeding from the breast is more likely to succeed if the process is understood.

The Baby's Part

In the animal kingdom the initiative is often taken by the neonate, who may have the mobility and the instinctive compulsion which enable it to find the nipple, and the mother's part is to be completely inert. For instance, the piglet at birth is compelled, presumably by smell, to scramble round, or over, its mother's hind legs until it reaches an unseen nipple, while the mother lies still. The human mother must take the active part which brings the two together; but, even if she puts the baby near the breast, the baby though awake and apparently hungry may fail to feed.

When large numbers of babies are watched in their first attempts to feed, various patterns of behaviour can be seen. In the first place, immediately after birth and later, the baby may make sucking and kissing movements of the lips and mouth, open his mouth asymmetrically and turn his head, with or without the stimulus of a touch on the lips. This first activity appears to be a measure of the baby's state of excitation, and, though the movements are coördinated, apparently purposive, and clearly suggestive to the mother, they do not necessarily lead to feeding, even if the baby is held near the breast. As the baby becomes sleepy, these movements may subside without the satisfaction of nourishment.

Where feeding is easy the next phase may follow without being recognised; but where there is slight difficulty there is often one point, clearly recognisable to the mother and her attendant, when the baby changes in responsiveness. This change occurs when the baby first experiences the filling of his mouth right to the palate and the dorsum of the tongue with a nipple, or a nipple-substitute of the right shape. The full action of the jaws, tongue, and cheeks is evoked, and from then on the baby can almost put himself on the breast. It has been noticed that where the mother's breasts were sufficiently well-formed for the baby to hold the nipple in the lips but not protractile enough to evoke the full feeding response, the baby was apathetic. He settled on the nipple quietly and was not interested. The nurses described him as lazy or like a premature baby in behaviour. The pædiatricians looked for infection.

Nipple-shape as Sign Stimulus?

The concepts of instinctive behaviour in animals lately put forward by Lorenz (1952), Tinbergen (1951), and their co-workers have their counterpart in the behaviour of the newborn baby. A newly born or newly hatched animal does not react to all the changes which its sense-organs can perceive but only to a few of them. The stimuli operate within a limited perceptual world (Tinbergen 1951). The limitation may be to one type of sense and within that to limited qualities and patterns of stimuli which in a specific way evoke responses which are more elaborate than reflexes. If the essential quality and pattern of stimuli is presented by an artifice, the same behaviour may be evoked and the animal then appears to have made a mistake. Classical examples of this are the gosling's attachment to its first living companion, even if human (Lorenz 1952); and the young herring-gull's attempt to feed from a red spot without a head attached to it rather than from a herring-gull's bill and head without a red spot (Tinbergen 1951). Manifestations of instinctive behaviour have been found to be evoked by a limited and definable stimulus, called a sign stimulus, which releases an innate mechanism within the animal. The consistency of the response, its apparent purposiveness, and its degree of coördination, even when evoked without previous experience, qualify the action to be called instinctive.

A baby is led to suck not by sight, hearing, smell, or taste, but by tactile stimuli alone. Two forms can be distinguished: the touch on the circumoral area which is more rousing than touch in other parts of the body but which at first has no specific effect; and touch within the mouth with an article, whether nipple, bottle-teat, or adult finger, which by its shape modifies the baby's responsiveness lastingly. The specificity of the stimulus and the lasting modification which it effects suggest that this is a sign stimulus working on an innate release mechanism. The non-specific early activity of sucking, mouth movement, and head turning is thought to be a form of innate automatism.

In animals some forms of instinctive behaviour may be evoked only during a limited and appropriate phase of the animal's life. In the neonate, the sign stimulus—the filling of the mouth with a specific shape—must occur within four or five days after birth or the full effect of the response may be lost.

Investigation

If the physical shape of the nipple is the sign stimulus of instinctive activity in feeding, it should be possible from the mother's breast-shape to predict the baby's feeding behaviour. To test this hypothesis I investigated the breast shape of 150 women.

Method of Assessment

When a baby takes the breast he draws the nipple to the back of his mouth, and the gums, lips, and tongue

Fig. 1—Instrument for measuring protractility of nipple.

hold and work on the yielding tissues underneath the areola and behind the nipple. A well-formed nipple enables a baby to take a breast more easily than one which has no substance, but the shape of the nipple is secondary in importance to the length which the tissues behind the nipple offer to the baby's mouth. For the tissues to be accessible the nipple must be not too large to enter past the baby's bite, and the tissues when drawn forward must be able to pass the gums.

In designing an instrument to measure the protractility of the nipple and the tissues behind it, the first step was to measure the distance between the gums of a number of babies. This was done by touching their mouths with sterile glass-plates and measuring through the glass while the babies tried to suck the plates. 2 cm. was found to be a usual measurement.

A glass instrument was then made somewhat resembling a mouth in shape—a flattened tube with internal diameters of 4 and 2 cm. The open end was curved like jaws, the other was connected to a source of suction and a manometer. The instrument was graduated in centimeters from the jaw end (fig. 1). For use, the open end was put over the nipple and over as much areola as could be put into it, a suction of 60 mm. Hg was applied, and the distance which the nipple reached down the tube was recorded.

Results

The distribution of the patients in the groups of measurement is given in table I.

TABLE I—PROTRACTILITY OF BREAST IN 150 WOMEN

—	Protractility (cm.)							
	2	2·25	2·5	2·75	3·0	3·25	3·5	3·75
Primiparæ ..	4	10	41	33	18	0	0	0
Multiparæ ..	0	0	8	9	18	6	2	1

It will be noted that parity improves the shape of the breast. Of the 87 women offering a length of 2·75 cm. or more, 7 failed to feed their babies (2 because the mothers were unwilling, 2 because the mothers were ill, and 1 because of true prematurity); and only 2 of the failures were connected with breast shape. The success of the 63 women with short accessible hold is given in table II.

Among the 16 " unsuccessful " mothers with measurements of 2·5 cm. or less, 3 failures were unrelated to breast shape (1 unwilling mother, 1 ill baby, 1 truly premature baby). 2 (2 cm. length) failed because the baby was unable to take the breast. 3 of the babies whose mothers' measurements were 2·5 cm. or less, and 1 whose mother had a larger measurement, failed because they fought at the breast. But 8 failed because of their apathy. 5 of the 8 were given no substitute for oral stimulation. Usually if a baby will not feed by the third day supplementary food is given in a way which provides a sign stimulus—by bottle. Each of the 5 had been paired at birth with another baby, chosen because the mother had an adequate protractility length. The 5 pairs of babies received all extra feeds in the first five days of life from a spoon. The 5 whose mothers' breasts were well formed fed and developed normally, but all the other 5 remained apathetic feeders for at least four weeks. The nursery staff were kept in ignorance of the nature of the investigation while it was in progress and are believed to have treated the babies equally. Many other babies showed an apathetic response for the first two or three days, but soon became eager takers when their positions at the breast were improved and they obtained full oral stimulation.

Confirmation of the relation between the vigour of the baby and oral stimulation came from twins whose mother's breasts were sufficiently protractile. The larger, a boy weighing 7 lb., was apathetic while the smaller girl was vigorous. The boy had a much smaller mouth and never drew his mother's exceptionally large nipples to the back of his mouth.

I suggest, therefore, that an adequately shaped breast, presenting a nipple as a knob with yielding tissues beneath the areola, acts as a sign stimulus to the baby. Where this fails, the critical time for its reception may pass, and a more than fleeting apathy results. A bottle-teat may take the place of the natural sign stimulus and may even serve better than a poorly shaped one.

Ethnologists have found some artificial sign stimuli to be more effective than the natural ones. For instance, an oyster-catcher, presented with her own eggs and with wooden ones of twice the size, sits on the wooden ones. A bottle-teat may similarly be a super-normal sign stimulus.

TABLE II—FEEDING BY 63 WOMEN WITH SHORT ACCESSIBLE HOLD

—	Protractility (cm.)					
	2·0		2·25		2·5	
	Primip.	Multip.	Primip.	Multip.	Primip.	Multip.
Successful ..	1	0	4	0	34	8
Unsuccessful ..	3	0	6	0	7	0

Primip. = primiparæ Multip. = multiparæ

Apathetic Response

Breasts alter in shape in the first days of lactation. This alteration was at a minimum in this investigation, because the mothers received minute doses of œstrogens after delivery and did not develop engorgement. Where the baby failed to keep up with secretion, milk was removed with a milking-machine which did not disimprove the shape of the breast. Variation in shape seemed to be a minor factor, no greater than those introduced by variations in the baby's posture at a feed.

When the baby would not feed the mother became discouraged and sometimes she gave up quickly.

A distinction should be made here between the baby who responds to the bottle though his innate mechanism was not released by the breast, and the baby who is not really interested in the bottle when he ultimately gets it. This second type have been classified as lastingly apathetic. It seemed that those whose release mechanism had been activated by a bottle-teat where it was supernormal to the mother's breast soon used a different mouth mannerism in expectation of the bottle-teat. Their lips were more O-shaped and the tongue tended to go up. This is often noticed by midwives. The mannerism makes breast-feeding harder to achieve. Nipple shields and complementary bottle-feeds will have this effect, despite good position at the breast, if the available hold is definitely short. Here the mother gives up, not only because of her own rejection, but because of the success of the bottle. If feeding is going to be possible,

Fig. 2—Correct position of lip.

Fig. 3—Faulty position of lip.

bottle-teats should not be given to these babies. In either type of apathy, secretion may be reduced by the mother's distress.

Another form of behaviour at the breast, which caused failure in 4 cases in the present investigation is for the baby to fight and press himself away from the mother. When the sequence of events is watched, it is found that when these babies have been put to the breast the airway has been obstructed—sometimes by the breast or by nasal obstruction but most commonly by the baby's upper lip rising up and covering the nostrils. Usually a baby who has received one or more full oral stimuli curls his upper lip down (fig. 2), keeping the airway clear; but in some with faulty position, and in many where the wide angle of the breast makes the hold short and insecure, the upper lip curls up (fig. 3). It has been maintained that newborn babies are not easily conditioned; but this fighting response, typical of an anoxic baby, can be established by two or three episodes—after which it is seen before the baby even takes the breast. If the physical satisfaction is provided by a bottle-teat and the child while tranquil is turned towards the mother, the breast can be quickly substituted for the teat and the baby usually learns to feed normally after two or three successful feeds. This conflict between the primary urges to breathe and to feed is a common first neurosis which can easily be resolved once it is recognised.

Discussion

The feeding behaviour of nurslings was described by Middlemore (1941) with delightful accuracy. She considered many possible reasons for the existence of types of behaviour and suggested that babies were born into their categories and that the mother's handling contributed to their make-up. All the observations which she made can take their place in the types of behaviour described in this investigation, but viewed from the present standpoint their interpretation is different.

Middlemore says: "The active satisfied babies established the sucking reflex and rhythm quickly . . . and showed their pleasure by seeking the nipple when it was withdrawn." This describes babies after full oral satisfaction. Under the heading "sleepy satisfied sucklings," she mentions that the gently sucking child does not draw the nipple deeply into his mouth—not far enough to activate the chain of the sucking reflex. "They did not move much or cry at the breast." It is hard to distinguish these babies, and the "simply inert" "who were like premature children only in dullness and lack of vigour" from those I have classed as apathetic. The "excited ineffective sucklings scrambled about the breast, their desire for the nipple was evidently strong but contact with the breast . . . was unpleasant" fits exactly the baby I have described as "fighting" the breast. Middlemore mentioned that these babies were often clumsily handled. That is almost always so; but the clumsiness seems to be the result and not the cause of the baby's behaviour.

There has long been a controversy (Engelmann and Hamburger 1927, Reiprich 1929) about the time when a baby should first go to the breast. Hippocrates, Harvey (1766), and Erasmus Darwin (1801) have pointed out that normal babies will suck at birth, and it has often been said that, if a child is put straight to the breast after birth, feeding presents no difficulties. This was open to the interpretation that a midwife would only trouble the mother to suckle where the conformity of the breasts would make feeding easy.

If, as is now suspected, the vigour of the response in the baby fades if full stimulation has not been experienced in the first days, there seems reason to accept the wakefulness of the baby immediately after birth as the time for his first feed. Newborn calves are fully active soon after birth and then tend to be sleepy for ten hours or more, and this sleepiness seems to come to babies too. There may then be only a few opportunities for the baby to take the breast, for even a well-shaped breast may become difficult if engorgement arises, and the chance may be missed. Anxiety is sometimes expressed about the danger of vomiting if babies are fed soon after birth. This point needs further investigation. It is remarkable, however, that a baby who has been induced to swallow what he does not like will probably spew it back, whereas if a pleasant taste is added the unpleasant material is not returned. Agreeable-tasting colostrum probably acts as a confirming stimulus, and may have the additional effect of sending the stomach contents along its proper path.

I have in this paper laid emphasis on the importance of length of hold offered by the yielding tissues of the breast behind the nipple. Measurement has confirmed that when a breast is assessed early in pregnancy the criterion of adequacy should not merely be a feeling that one could get a baby to take that nipple, but whether the breast when compressed by the finger and thumb laid on the margins of the areola will offer a hold roughly as long as a bottle-teat after passing a 2-cm. gap. Where it does not, the mother should be given treatment with "shells" designed by Waller (1946), who estimated that 40% of British primiparæ need this help. Poorly shaped breasts are common in fair-haired Europeans, especially among the redhaired, and I have not seen them in Negroes, though they have been noticed in Africa by Williams (1955).

I hope that this description of how a baby's instinctive action of feeding is aroused will draw attention to the strength of the instinctive response. If this is recognised, the aim of antenatal breast care becomes clearer and the mother has a better chance of suckling her baby successfully.

Breast-feeding is often the first—and a very important—form of mother and child relationship. When a mother is very anxious to feed her child and he refuses and fights, she is profoundly depressed. She may be found weeping before each feed, and her delight in her child may be completely taken away by her misery. The mother of the apathetic baby has an urge to chivy her baby and may do so for weeks. The mother of one of the apathetic babies of this investigation reported that, soon after leaving hospital, she had been admitted

to a clinic because the baby was such a poor feeder. The nurse in charge, with every good intention, devoted herself for three days to rousing the baby, tweaking, pinching, and slapping it during all feeds. She recommended that the father should do the same for as long as necessary. One can imagine that the mother's despair at the child's poor urge to feed had already provided a basis for an unhappy relation between father, mother, and child. If these two types of failure in suckling technique can be avoided a positive step will have been taken towards a secure relationship.

But the other side of the picture should not be forgotten. A trick should not be used to deprive a nursing couple of the time of wooing, and there is no need to tell a mother that she will not know how to feed her baby; nor is there need to imply by gesture that a third person's aid is necessary. If the mother's nipples are sufficiently protractile, and if she sits comfortably in a good position, the help given need not intrude on the mother's tenderness towards her baby.

Summary

Instinct does not necessarily inform a mother how to feed her baby.

The baby's part is an instinctive response comparable to instinctive behaviour described in animals. The nipple, and the protractile tissues behind it, when put far into the baby's mouth act as "sign stimuli." The degree of protractility was found to be related to success in feeding from the breast. Where the protractility was deficient, the baby was likely to be unresponsive.

A baby may fight at the breast. This behaviour is thought to be a conditioned response arising from difficulty in breathing during a few feeds.

It is a pleasure to thank Prof. W. C. W. Nixon and Dr. R. E. Bonham Carter, in whose departments this work was carried out, and also Sisters M. Curtis, D. Lyon, and M. Seligman for their unstinted help.

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TREATMENT OF RHEUMATOID ARTHRITIS BY PROLONGED STIMULATION OF THE ADRENAL CORTEX

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IT has been generally assumed that for rheumatoid arthritis cortisone therapy and corticotrophin therapy amount to the same thing. There have been accounts of patients treated for prolonged periods with known amounts of cortisone acetate, but there has been no account of a group of patients treated for a prolonged period with known amounts of adrenal stimulation. This paper reports such a group.

Theoretically there may well be qualitative differences between treatment with cortisone acetate and by adrenal stimulation. Cortisone acetate therapy involves the suppression of the adrenal's output not only of hydrocortisone but also of corticosterone and several other steroids secreted in small amounts, including both corticosteroids and 17-ketosteroids. That only the hydrocortisone plays a part in metabolism is an assumption.

Corticotrophin, on the other hand, stimulates the secretion of all these substances and may have, in addition, effects on metabolism that are independent of the adrenal glands. If corticotrophin was a pure non-antigenic hormone that could be standardised in such a way that a given intramuscular dose would provide a known degree of adrenal steroidogenesis, it would be easy to assess the therapeutic value of different degrees of adrenal stimulation. As it is, we find that the adrenal response to a given intramuscular dose of corticotrophin varies from patient to patient, and, in any one patient, from time to time. This being so, it is essential to make repeated assessments of the corticosteroid output of the adrenal glands to study the effect of any level of adrenal stimulation over a prolonged period. In this study the assay of urinary 17-ketogenic steroids (Norymberski et al. 1953) has been used to this end.

Choice of Patients

The patients we chose for both corticotrophin treatment and cortisone treatment were incapacitated by active and progressive rheumatoid arthritis and had not improved at all after much conservative therapy. Their allocation to treatment with corticotrophin or with cortisone acetate was determined almost entirely by the availability of these preparations, and so it will be reasonable to compare the corticotrophin-treated group with the group receiving long-term cortisone-acetate therapy previously reported (West and Newns 1953).

Dosage

Various brands of long-acting corticotrophin were used, and such doses were given as would lead to a daily urinary output of 15–40 mg. of 17-ketogenic steroids, the level aimed at depending on the severity of the rheumatoid arthritis at the time. A daily output of 15 mg. of 17-ketogenic steroids is usually too little to have any effect, and an output of 40 mg. of 17-ketogenic steroids is usually too high to be maintained for many weeks without causing hypertension. The doses of corticotrophin found necessary were $7\frac{1}{2}$–40 units given daily by intramuscular injection. The unit contains a third of a U.S.P. unit of corticotrophin, since the makers assume that in the long-acting form the corticotrophin will be three times as potent as in the rapidly absorbed aqueous form.

With twelve-hourly injections of long-acting corticotrophin the daily urinary output of 17-ketogenic steroids may progressively rise to well over 100 mg. a day, whereas the highest output that we have observed in the twenty-four hours following a severe surgical operation has only been 55 mg. To control the level of adrenal stimulation we assay twenty-four-hour specimens of urine every five to seven days until a suitable maintenance level has been found, and subsequently not less than monthly.

The Patients

11 patients were treated continuously for from one to two years. Of those who stopped receiving adrenal stimulation before a year was completed none did so because the therapy was ineffective or inadequate and only two stopped because of complications. In each case excessive adrenal stimulation was responsible. This could have been avoided. One patient had scleroderma as well as rheumatoid arthritis. There were 6 males aged 16–51 (average 41) and 5 females aged 41–69 (average 50).

Duration of Disease at Start of Corticotrophin Therapy

In the males the disease had lasted from 3 months to 13 years (average 4·7 years) and in the females from 2 to 20 years (average 6·5 years). In only 1 patient was

the disease of short duration; he was aged 14, had had severe rheumatoid arthritis for 3 months, and his fever had not responded to eight weeks' salicylate therapy.

Duration of Corticotrophin Treatment

The males were treated for 12–17 (average 15) months and the females for 12–24 (average 17) months.

Findings

Erythrocyte-sedimentation Rate

At the start of corticotrophin treatment the average erythrocyte-sedimentation rate (E.S.R.) was 38 mm. in 1st hr. (Wintrobe), and at the end of treatment 19 mm. in 1st hr. The changes in the 11 cases were as follows:

38	50	27	9	37	13	32	62	57	43	51
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
6	7	20	9	20	7	36*	40*	11	23	30

* Adrenal stimulation was slight at this time.

Hæmoglobin

At the start of corticotrophin treatment the average amount of Hb was 12·3 g. per 100 ml., and at the end of treatment 13·3 g. per 100 ml. The individual changes were as follows:

Males

12·6	10·8	16·5	15·5	14·5	12·3
↓	↓	↓	↓	↓	↓
15·1	15·8	16·4	14·4	15·1	12·6

Females

13·7	10·5	8·7	9·7	11·0
↓	↓	↓	↓	↓
13·0	8·7*	9·3†	12·6	13·7

* This patient's anæmia was due, we think, to malnutrition. For family reasons she had to stop the injections, after 18 months, and change to 50 mg. of cortisone. She has been fed properly from that time, and her Hb is now 12 g. per 100 ml.

† This patient's Hb increased to 12 g. per 100 ml. but has decreased since coincidentally with a gradual failure of 'H.P. Acthar Gel' to stimulate her adrenals.

White Cells

At the start of corticotrophin treatment the average white-cell count was 8600 (range 5410–10,400) per c.mm., and at the end 10,900 (range 4900–16,000) per c.mm.

Eosinophils

When adrenal stimulation was excessive, the eosinophil-counts were usually low. At the levels of adrenal stimulation we used the counts were meaningless (although taken at the same time of day each time).

Plasma

Monthly estimations of plasma-proteins, albumin/globulin ratio, plasma-fibrinogen, and plasma-cholesterol were made for three years in all our patients treated with either corticotrophin or cortisone. We have now given them up as a waste of time. The serum-cholesterol levels have not tended to rise. The plasma-protein levels have returned to normal in the few cases starting with a gross abnormality, and have subsequently fluctuated within roughly normal limits in quite an erratic manner.

Weight

At the start of corticotrophin treatment the patients weighed 77–161 (average 130) lb., and at the end 89–169 (average 147) lb.

Blood-pressure

At the start of treatment the blood-pressure was 115–150/70–100 (average 127/77) mm. Hg, and at the end 115–180/70–100 (average 136/84) mm. Hg.

Strength of Grip

This was tested with a sphygmomanometer cuff. At the start of treatment the strength in the right hand was 30–140 (average 88) mm. Hg, and in the left hand 30–110 (average 79) mm. Hg, and at the end 60–260 + (average 174) mm. Hg in the right hand and 40–260 + (average 171) mm. Hg in the left hand.

Physical Ability

This was graded as described by the joint committee of the Medical Research Council and Nuffield Foundation (1954):

Grade 1: fully employed or employable in usual work and able to undertake normal physical recreation.

Grade 2: doing light or part-time work and only limited physical recreation (for housewives all except the heaviest housework).

Grade 3: not employed and unemployable, no physical recreation (for housewives only light housework and limited shopping).

Grade 4: confined to house or to wheeled chair but able to look after self in essentials of life (hospital patients confined to bed).

Grade 5: completely bedridden.

At the start of corticotrophin treatment the average grade of physical ability was 3·2, and at the end 2·1. This assessment can easily be affected by wishful thinking. It is true that every patient felt better in himself or herself and could do more physically. The patients were in no two minds about this.

Radiological Evidence

The comparison of radiographs before and at the time of review was difficult owing to differences in technique and in the type of films used. Nevertheless the following conclusions were reached:

(1) In only 2 cases was there evidence of an extension of bone erosion (a very minor increase). No new erosions were observed.

(2) In *no* case was there definite evidence of increased osteoporosis.

(3) In 3 cases the bone density appeared to have improved, but the films were not comparable (allowance had been made for this).

(4) In 1 case the density of the bones of the hands had much improved.

(5) Multiple deposits—calcinosis circumscripta—about the fingers of the patient with scleroderma had almost completely disappeared.

(6) In 1 case there was radiological evidence of a rapid increase in bone erosions in 4 months before treatment. Since treatment no new erosions have appeared and the edges of existing erosions appear to have hardened.

COMPLICATIONS

In 4 patients the blood-pressure rose somewhat (diastolic from 90 to 100 mm. Hg). During moderate adrenal stimulation (30–40 mg. of 17-ketogenic steroids) pigmentation appeared in 2 patients. A leucocytosis usually accompanied severe stimulation. Osteoporosis of the spine has been reported as a complication of corticotrophin and of cortisone treatment. The spines of these patients were not radiographed. It is our impression from the literature that excessive adrenal stimulation may have been responsible for the cases reported.

Comparison with Cortisone-treated Group

	Cortisone acetate	*Adrenal stimulation*
Physical ability	3–2·7	3·2–2·1
Grip (mm. Hg):		
Right	150–155	88–174
Left	100–153	79–171
E.S.R. (Wintrobe) (mm. in 1st hr.)	34–29*	38–19*
Hb (g. per 100 ml.)	11·3–12·3	12·3–13·3
White cells (thousand per c.mm.)	7700–9200	9600–10,900
Blood-pressure (mm. Hg)	131/79–135/84	127/77–135/84
Weight (lb.)	130–143	130–147

* These figures need qualification. The pre-treatment E.S.R. for the cortisone-acetate patients was an average of the readings taken for the six months before therapy began. The readings for the corticotrophin-treated patients were taken immediately before treatment began and may well have been higher in consequence. Further, when 22 long-term cortisone-acetate patients were transferred to 'Cortisol' (hydrocortisone-free alcohol) for three months their average E.S.R. fell further to 27–21·5 mm. in 1st hr. (West and Newns 1954.)

Radiological Findings

In the cortisone-acetate group 16 of 27 patients showed evidence of new bony erosions or of increase in existing erosions. The adrenal-stimulation group revealed only 2 of 11 with some increase in bony erosion.

COMPLICATIONS

The only complications in the adrenal-stimulation group were those mentioned above. In the cortisone-acetate group (almost three times the size) there were 5 instances of intestinal hæmorrhage in 3 patients.

Discussion

There seems to be little doubt that, under the conditions of these trials of controlled adrenal stimulation and cortisone-acetate therapy for severe rheumatoid arthritis, the former method has produced better results. One is forced to the conclusion that adrenal stimulation, at the levels described, has favourably affected the course of rheumatoid arthritis in this particular group of patients—so far.

Since this conclusion carries with it important implications, we have gone over the records of these patients with great care and have studied them in graphic form, looking for any evidence that might upset the conclusion. The only observation that came to light was that the results might well have been better, in some instances, had the level of adrenal stimulation been adequate (without being excessive). It must be emphasised, of course, that there is no question of patients having been cured, and it must be remembered that the patients are still receiving treatment.

The technical disadvantages of corticotrophin treatment lie in the need for daily injections and for urinary assays. Our patients have given their own injections (about 10,000) without mishap. As regards the assays, these are no more difficult than assays for 17-ketosteroids. Both disadvantages would be reduced if corticotrophin could be produced with a longer action and with a constant effect when given intramuscularly. A further disadvantage not gone into here is the possibility of allergic or anaphylactic reactions in patients given repeated courses of corticotrophin. On the credit side is the fact that on withdrawal of corticotrophin therapy the adrenal glands are left active and possibly enlarged, whereas on withdrawal of cortisone treatment they are inactive and possibly smaller.

Conclusions

The study of this small group of rheumatoid patients receiving mild to moderate adrenal stimulation for from one to two years suggests that the maintenance of a daily urinary output of 20–35 mg. of 17-ketogenic steroids will favourably influence the course of moderately severe rheumatoid disease. In consequence we feel that every effort should be made to extend this therapeutic trial and to find a more satisfactory adrenal stimulant for long-term use than the present preparations of corticotrophin.

The preparations of long-acting corticotrophin were supplied by the joint committee of the Medical Research Council and the Nuffield Foundation for the trial of cortisone, corticotrophin, and other therapeutic measures in the treatment of chronic rheumatic diseases.

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"... Democracy has been described as being like the perfect wife—lovely, but not fast."—Mr. J. R. H. HUTCHISON, *Hansard*, March 1, 1955, col. 2014.

INTRARENAL PRESSURE IN EXPERIMENTAL TUBULAR NECROSIS

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ACUTE tubular necrosis in man sometimes follows a sudden and sustained reduction in blood-volume such as occurs with accidental trauma, surgery, and severe diarrhœa and vomiting; it is a complication of abortion, accidental hæmorrhage, and mismatched blood-transfusion; and it can also be caused by the ingestion of certain poisons, such as mercury. There is much evidence that all these conditions, whether or not renal failure develops, are associated with renal ischæmia, and it is therefore probable that the tubular necrosis which occasionally takes place is only a reflection of the intensity of this primary ischæmia (Oliver et al. 1951); with poisons there is the additional damaging effect of the poison on those tubule cells which are concerned with its secretion into the urine.

It has been shown that, once acute renal failure has developed, severe renal ischæmia may persist for several weeks, though the initial stimulus for the ischæmia is no longer present (Bull et al. 1950). The cause of this secondary renal ischæmia is not known; but, because kidneys with tubular necrosis are heavier and feel firmer on palpation, and because demonstrable breaches in continuity of some of the nephrons seem to allow free communication between their lumina and the interstitial space, it has been suggested that the ischæmia is due to interstitial œdema (Oliver et al. 1951, Oliver 1953, Peters 1945). Decapsulation of the kidneys is a therapeutic extension of this hypothesis.

It is impossible to measure the renal interstitial pressure directly; instead, the pressure obtained by inserting a needle into the renal substance has been measured, and this has been called the intrarenal pressure. The following experiments were performed to establish what changes take place in the intrarenal pressure when the tubules have recently become necrosed, and what effect decapsulation has, in these circumstances, on this pressure.

The findings suggest that the renal interstitial pressure in a necrosed kidney is not raised, and that the renal ischæmia is due to vasoconstriction.

Method

Necrosis of the left kidney was produced in dogs by occlusion of the renal artery for three to four and a half hours, the right kidney being used as a control; several days later the intrarenal pressure of the two kidneys was measured and compared; in some dogs the pressure was also measured after transient occlusion of the thoracic aorta, and in others before and after decapsulation of the left kidney.

The experiments were made on eight dogs, weighing 10–16 kg., anæsthetised with intravenous pentobarbitone. The left kidney was exposed through a flank incision, and the renal artery completely occluded with two modified Michel clips (the renal vein was not occluded). After three to four and a half hours the clips were removed and the flank wound was closed. Two days later dogs 3–8, and four days later dogs 1 and 2, were again anæsthetised, and then suspended from a horizontal beam. Both kidneys were now exposed simultaneously by bilateral flank incisions. In dogs 1, 2, 6, and 7 both kidneys were brought out so as to be superficial to the muscle layers. In dogs 3, 4, 5, and 8 the kidneys were not disturbed from their normal position in the abdominal cavity; this was obviously a more desirable preparation,

but it reduced the available surface into which the needle used for measuring the intrarenal pressure could be inserted.

Continuous and simultaneous measurement of the intrarenal pressure in both the control and the necrotic kidneys was obtained by a technique which has been described previously (Miles and de Wardener 1954). Needles (24 British Standard gauge with an external diameter of 0·56 mm.) filled with heparinised saline solution and joined to capacitance manometers by 'Polythene' tubing 0·5 mm. in internal diameter were inserted into either the cortex or the medulla of the renal substance. Since no difference was found between the pressure in the medulla and that in the cortex, the needles were most often placed in the cortex, when the needle was inserted obliquely to a depth not greater than 0·5 cm. The intrarenal pressure of both kidneys was then observed continuously for three to eight minutes, intermittent or continuous photographic records of the pressure being taken during that time. Both needles were then withdrawn and reinserted into different sites, and the intrarenal pressure was again measured. In this way the intrarenal pressure was measured in 6–12 sites in each kidney. The arterial pressure was measured with a mercury manometer via a polythene catheter inserted into the arch of the aorta.

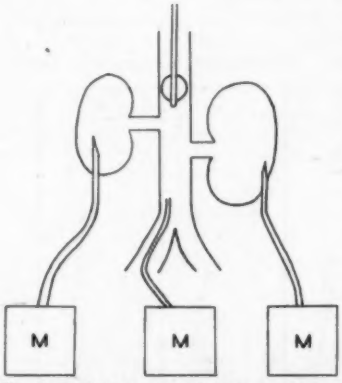

Fig. 1—Technique of obtaining continuous simultaneous measurements of intrarenal pressure of necrosed (left) and control (right) kidneys before, during, and after arterial pressure to both kidneys had been lowered by inflating a soft-rubber balloon in the descending thoracic aorta. Distal arterial pressure was measured via a polythene tube in the abdominal aorta; the intrarenal pressure of both kidneys was obtained via needles in the cortices; all the pressures were measured with capacitance manometers (M).

In three dogs the renal-perfusion pressure to both kidneys was lowered suddenly to about 20 mm. Hg for five minutes by inflating a small soft-rubber balloon inserted into the descending thoracic aorta via the right carotid artery. This manœuvre, which was repeated several times in each dog, was accompanied by a slight transient rise in pressure proximal to the balloon. In these experiments the arterial pressure in the abdominal aorta was measured with a capacitance manometer via a polythene catheter inserted through the right femoral artery (fig. 1).

In three dogs the necrosed kidney was decapsulated with a curved blunt probe and rat-toothed dissecting forceps, care being taken to handle the kidney as little as possible. After decapsulation thirty minutes was allowed to elapse before the intrarenal pressure measurements were repeated.

At the end of the experiments the dogs were killed with an overdose of pentobarbitone, and both kidneys were removed, weighed, and examined histologically.

Results

Pathology

The accompanying table gives the length of time the left renal artery was occluded, the weight of both kidneys, and a rough indication of the extent of the structural damage found in the left kidneys.

EFFECTS OF OCCLUSION OF LEFT RENAL ARTERY

Dog no.	Duration of occlusion (hr.)	Weight of kidneys (g.)		Histology of left kidneys	
		Control	Necrotic	Cortex	Medulla
1	4·5	42	51	+++	+++
2	4·5	40	54	++	++
3	4·0	35	42	++	−
4	3·5	32	34	++	−
5	3·0	40	35	++	−
6	3·5	20	24	+	−
7	3·5	35	40	++	++
8	3·5	26	30	++	−

+++, complete necrosis.
++, extensive necrosis interspersed with patches of normal structure.
+, necrotic and normal areas about equal.
−, no evidence of damage to cells.

The left kidneys were firmer, larger, and heavier than the control (right) kidneys; the mean weight of the left kidneys was 38·5 g. and that of the right kidneys 33·5 g. The histological appearances of the tubules in the cortices of the left kidneys varied from necrosis of the whole cortex to extensive necrosis interposed with local patches of relatively normal tubules. The least affected areas in the cortices of all the necrosed kidneys were in the region of the juxtamedullary glomeruli; and in three dogs there were thin scattered areas of normal cortex lying immediately beneath the capsule.

The pathological changes in the medullæ of the left kidneys were as follows: in one dog, complete necrosis; in two others, scattered areas of necrosis; in the remainder the appearances were normal except for colloid casts found in most of the medullary luminæ of all the left kidneys.

Cortical Intrarenal Pressures

Figs. 2 and 3 illustrate the result of all needle insertions.

Each point in fig. 2 represents the intrarenal pressure obtained from each insertion of the needle into sites where the pressure was relatively stable. In some sites, however, particularly in the necrosed kidney, the intrarenal pressure fluctuated considerably (fig. 4); the extent and frequency of this phenomenon are shown in fig. 3, where each vertical line represents the highest and the lowest pressures obtained at separate insertions of the needle. All insertions of the needle where the pressure fluctuated by more than 10 mm. Hg are represented; in those control kidneys (dogs 1, 4, and 8) where fluctuations of this order were not observed the next largest fluctuation has been shown.

The intrarenal pressures obtained from areas relatively free from fluctuations showed a fairly wide scatter on the control side, with an even greater scatter on the necrosed

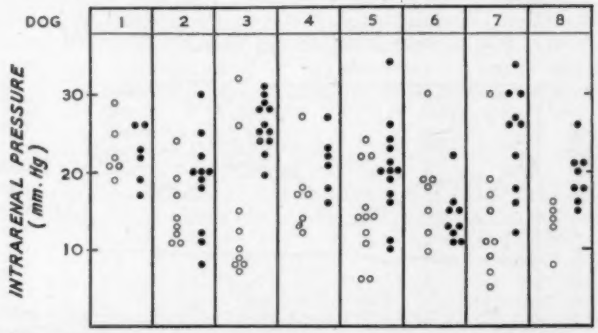

Fig. 2—Intrarenal pressures from necrosed (○) and control (●) kidneys of eight dogs, obtained by inserting needles into sites where pressures were relatively stable.

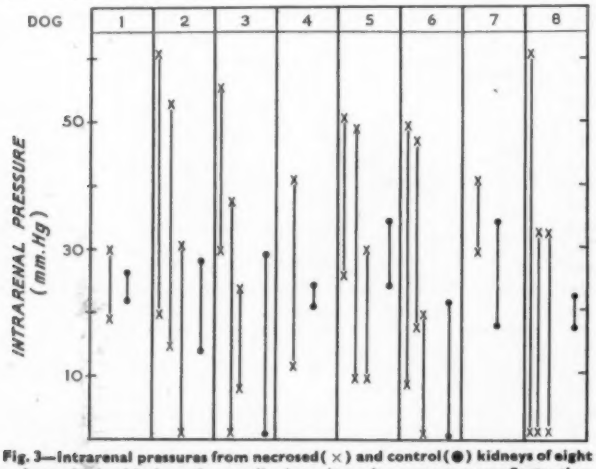

Fig. 3—Intrarenal pressures from necrosed (×) and control (●) kidneys of eight dogs, obtained by inserting needles into sites where pressure was fluctuating. Each vertical line represents highest and lowest pressures obtained from separate insertions of needle into areas where pressure fluctuated by more than 10 mm. Hg. In dogs 1, 4, and 8, in which no such fluctuations took place in control kidney, next largest fluctuations are shown.

side (fig. 2). The mean intrarenal pressure of the control kidneys was 22 mm. Hg, and that of the necrosed kidneys 16 mm. Hg.

Fig. 3 shows that pronounced fluctuations in pressure were more common and more extensive in the necrosed than in the control kidneys. In the necrosed kidneys fluctuations might consist of irregular swings ranging from 0 to 50 mm. Hg in ten to thirty seconds; at other times an initial pressure well above the mean would immediately begin to drift gradually and steadily to levels near 0 mm. Hg. In the control kidneys irregular fluctuations were seen on occasions but pressures did not swing far from the mean; a gradual drift down to very low pressures was also seen occasionally, but the point from which the drift would start was never far from the mean.

Effect of Sudden Severe Reduction of Renal Arterial Pressure on Cortical Intrarenal Pressure

Fig. 5 shows the intrarenal pressure before, and five minutes after, the renal arterial pressure had been lowered to about 20 mm. Hg. The intrarenal pressure was substantially reduced in both the necrosed and the control kidneys, and after five minutes' hypotension the intrarenal pressure in the necrosed kidneys was slightly lower than in the control kidneys, the mean pressure being 7 mm. Hg and 4 mm. Hg respectively.

Fig. 6 is a record of one of these experiments in dog 3. The needle in the necrotic kidney was in an area where there were occasional severe fluctuations in pressure, the renal arterial pressure being lowered while the intrarenal pressure was relatively high (40 mm. Hg) and stable. The reduction in renal arterial pressure was accompanied by a rapid reduction of the intrarenal pressure both in the necrosed and in the control kidneys, the rate of decrease being about the same in both. Five minutes later, however, when the arterial pressure was allowed to return to normal, the rise of the intrarenal pressure in the necrosed kidney was more rapid than in the control kidney; this disparity was recorded in eight of the eleven occasions on which the experiment was performed.

Fluctuations in the intrarenal pressure were never obtained when the renal arterial pressure was low.

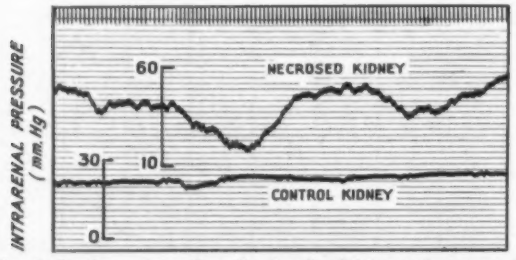

Fig. 4—Continuous recording (in dog 6) of intrarenal pressure in necrosed (upper tracing) and contralateral control kidney (lower tracing) showing wide fluctuations in necrosed kidney.

Effect of Decapsulation on Intrarenal Pressure of Necrosed Kidney

Fig. 7 shows the intrarenal pressure of the necrosed kidney before, and thirty minutes after, the capsule had been removed; there was no appreciable change of pressure.

Discussion

The procedure used to produce renal damage in these experiments was similar to that which, it has been shown, will produce histological changes

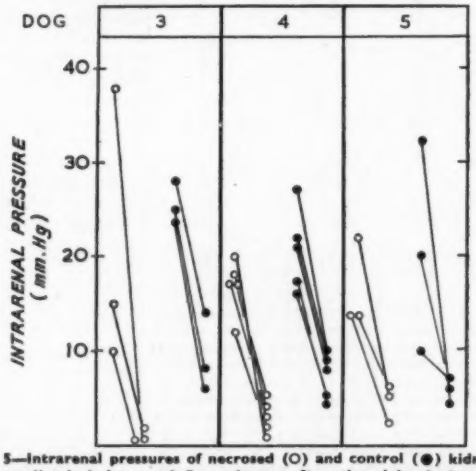

Fig. 5—Intrarenal pressures of necrosed (○) and control (●) kidneys immediately before, and five minutes after, the abdominal aortic pressure had been suddenly reduced to about 20 mm. Hg, showing the fall in intrarenal pressure which followed. The experiment was made three times in dogs 3 and 5, and five times in dog 4.

identical with those found in human tubular necrosis (Oliver et al. 1951), except that in man the lesions are usually less widely distributed. It has also been shown, both in man (Bull et al. 1950) and in animals (Phillips et al. 1945), that such lesions are associated with sustained severe renal ischæmia.

There is no histological evidence that intravascular thrombosis of renal vessels occurs either in tubular necrosis in man or in experimental tubular necrosis produced by transient occlusion of the renal artery in dogs. The sustained renal ischæmia accompanying tubular necrosis must therefore be due either to vasoconstriction or to compression of the vascular tree. It is clearly not due to compression of the renal arterioles, for no pressure obtained inside the necrotic kidney was of sufficient magnitude to do this; but compression of the peritubular venous capillaries and interlobular veins is a possibility, either by an increase in the interstitial fluid pressure or by an increase in the size of the tubules. If this were the primary cause of the renal ischæmia, however, the inevitable consequence of such compression would be a

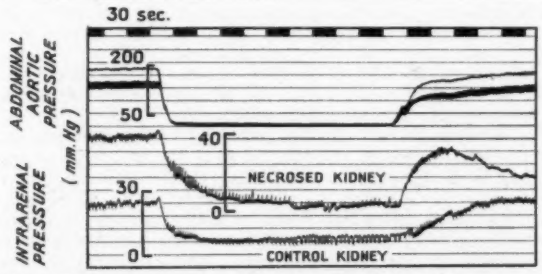

Fig. 6—Continuous recording (in dog 3) of abdominal aortic pressure (uppermost tracing), intrarenal pressure of necrosed kidney (middle tracing), and intrarenal pressure of control kidney (lowermost tracing) before, during, and after inflating a rubber balloon in the descending thoracic aorta for five minutes. As arterial pressure fell, intrarenal pressure of necrosed kidney decreased to the same low level as that of control kidney. The small sharp fluctuations in pressure in both intrarenal-pressure tracings are due to respiratory movements.

considerable rise in the peritubular venous capillary pressure. The evidence presented here and discussed below gives no indication of such a rise; so it is concluded that the ischæmia is due to arteriolar constriction.

The pressure measured by plunging a needle into the substance of the kidney is not only that of the interstitial space. An inspection of the needle in the cortex of the kidney makes it evident that the pressure obtained will be derived not merely from the pressure existing between the nephrons and the peritubular capillaries (the interstitial space) but also from that existing within these structures. This is the reason that the less precise term, the intrarenal pressure, is used. Swann (1951) has shown that the intrarenal pressure is almost certainly obtained from the lumina of the torn peritubular capillaries and interlobular veins, for he found that the pressures measured with a needle in the cortex of the kidney and from a catheter introduced into an arcuate vein are identical (20–25 mm. Hg). The renal venous pressure is about 10 mm. Hg, and the change to 20 mm. Hg appears sharply at the junction of the arcuate and the interlobar veins, where Swann et al. (1953) have demonstrated valve and sphincter-like organs by which they suggest the peritubular venous pressure is controlled. Rapid fluctuations in the intrarenal pressure also strongly suggest that the needle is measuring an intravascular pressure (Miles and de Wardener 1954). If blood is to flow, the extravascular, or interstitial, pressure must be lower than this intravascular pressure, but the gradient between the two is problematical; the flatness of the peritubular capillaries and the thinness of their walls make it unlikely that it is very great.

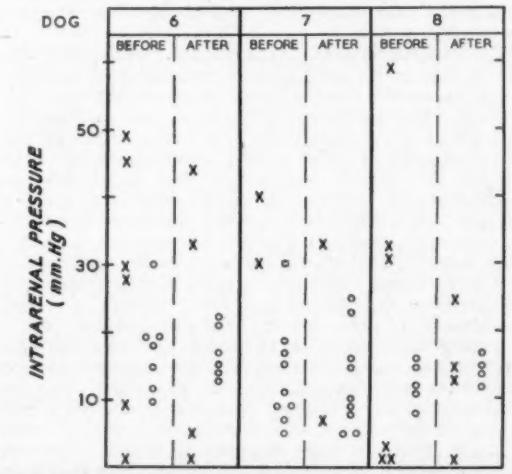

Fig. 7—Intrarenal pressure of necrosed kidneys of three dogs before, and thirty minutes after, decapsulation: O, in sites where pressure was relatively stable; ×, in sites where pressure was fluctuating, highest and lowest pressures obtained at each such site being shown.

The results given here show that the intrarenal pressure in the cortex and medulla of an experimentally necrosed dog's kidney is similar to, or less than, that of the contralateral control kidney, except that in the necrosed kidney severe fluctuations in pressure are often found (up to 60 mm. Hg). They also show that, when the descending thoracic aorta is occluded, the intrarenal pressure in both the necrosed and the control kidneys decreases to very low levels, and that fluctuations no longer occur, the intrarenal pressure of the necrosed kidney being then a little lower than that of the control kidney.

It may therefore be concluded that the pressure measured in both the necrotic and the normal kidneys is derived from the heart. The relatively low pressure obtained, however, and the absence of pulsations greater than 5 mm. Hg indicate that in both kidneys the pressure that is measured is not obtained from the arterial side of the renal circulation. The pressures in the necrotic and control kidneys are similar; so, if it is accepted that in both kidneys the lumina of the needles are in continuity with torn peritubular venous capillaries, and that the intrarenal pressure in the control kidney is a measure of the pressure within these capillaries, it follows that the peritubular venous capillary pressure in the necrosed kidney, whatever its value, is not raised above normal. It then follows that the sustained renal ischæmia that these necrotic kidneys must undoubtedly have had was due to arteriolar constriction and not to compression of the peritubular capillaries. The finding that during hypotension the intrarenal pressure in the necrotic kidney is slightly lower than in the control kidney is additional evidence that the renal interstitial pressure is not raised.

The exact mechanism responsible for fluctuations in intrarenal pressure is uncertain; but, as they can occur independently of changes in systemic pressure and cease with occlusion of the aorta, they appear to be related to local vascular phenomena initiated by changes in vascular tone. Previous observations with adrenaline and bleeding have certainly shown that changes in the intrarenal pressure can be induced by changing vascular tone (Miles and de Wardener 1954). The increased fluctuations in the intrarenal pressure of the necrosed kidney therefore probably reflect an increase in the variability of vascular tone, an observation which supports the conclusion that renal ischæmia is due to severe vasoconstriction, for instability is a characteristic of high vascular tone (Guyton and Harris 1951). This instability is particularly conspicuous in the kidney and can often be observed when a highly vasoconstricted kidney is perfused with a constant-output pump (unpublished observations).

The stimulus for the sustained vasoconstriction of tubular necrosis is a matter of speculation; it may be due to metabolites released from damaged tubules acting on the vessels directly or on the intrarenal nervous ganglia; or perhaps the primary renal ischæmia produces anoxic changes in these ganglia which perpetuate the vasoconstriction.

Though there is no evidence that in the necrosed kidney the pressure of the renal interstitial fluid is raised, the histological appearances suggest that its volume is increased. Such an accumulation would account for the increase in weight and volume of the kidney, and probably, though less obviously, for its increased firmness. An object is firm to the touch in so far as it resists changes in shape. The surface of the normal kidney is easily depressed owing to the fact that the fluid inside the kidney lies within relatively distensible tubes. When the surface is pressed at one point, much

of the fluid lying beneath this point can be rapidly displaced elsewhere. In the necrotic kidney, however, the accumulation of interstitial fluid lies outside these tubes, unable to move quickly when pressed on, with the result that the kidney feels firm on palpation.

The ineffectiveness of decapsulation on the intrarenal pressure of the necrosed kidney is in keeping with recent work showing that, in a normal kidney, even large induced changes in intrarenal pressure are not modified by the presence or absence of the capsule (Miles and de Wardener 1954).

Summary

The intrarenal pressure in dogs was measured with a capacitance manometer via a needle introduced into the substance of the kidney.

The left kidney was made ischæmic for three to four and a half hours, two to four days before the intrarenal pressure was measured.

The intrarenal pressure of the left (necrosed) kidney was measured simultaneously with that of the right (control) kidney, and the pressure in both was found to be similar, except that in some areas of the necrosed kidney there were large fluctuations in pressure.

When the descending thoracic aorta was suddenly occluded, the intrarenal pressure of both kidneys fell to very low levels, and fluctuations ceased.

Decapsulation of the necrosed kidney had no effect on the intrarenal pressure.

It is concluded that the sustained renal ischæmia of tubular necrosis is due to vasoconstriction rather than to a raised renal interstitial pressure.

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STAPHYLOCOCCAL INFECTION IN THE NEWBORN

TREATED WITH ERYTHROMYCIN

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STAPHYLOCOCCAL infection develops in about 10–15% of infants born in large maternity units (Nelson 1952, Barber et al. 1953, Edmunds et al. 1955). In such units staphylococci isolated both from cases of clinical infection and from nasal carriers commonly show resistance, in some degree, to the antibiotics in common use. For example, resistance to penicillin can now be demonstrated in 50–80% of hospital strains of *Staphylococcus pyogenes*, and resistance to the tetracyclines is increasing steadily (Kirby and Ahern 1953).

Satisfaction at the introduction of erythromycin, another antibiotic effective against the staphylococcus, has been tempered by the fear that resistance might develop rapidly if it were extensively used. Resistance in staphylococci has been readily induced in vitro (Hobson 1954), and resistant staphylococci have appeared after the regular use of erythromycin to control infection in burns (Lowbury and Cason 1954) and after prolonged treatment with erythromycin in subacute bacterial endocarditis (Haight and Finland 1952). It is in cases of this type that resistance might be expected; but experience of erythromycin in the treatment of staphylococcal infection has been insufficient for the proper assessment of the risk of resistance developing in ordinary hospital practice (Herrell et al. 1953, Kirby et al. 1953). Fortunately there does not seem to be cross-resistance between erythromycin and other antibiotics in common use.

Present Investigation

The present investigation was designed to test the efficacy of erythromycin in neonatal staphylococcal infection and particularly to determine whether resistance would appear quickly under controlled conditions.

The trial took place in the maternity units of two hospitals. In Hospital E all clinical infections were treated with oral erythromycin ('Ilotycin' suspension) 20 mg. per lb. of body-weight daily in divided doses given six-hourly. In Hospital W clinical infections were treated with the same dosage of erythromycin at the same intervals, but in addition a daily injection of streptomycin (0·125 g.) was given. It was hoped by this means to determine whether combined therapy would reduce the risk of resistant strains emerging. Streptomycin was chosen because in these units 80% of strains of *Staph. pyogenes* were sensitive to it (Forfar et al. 1953).

As a preliminary to the trial a survey of antibiotic sensitivity was made in Hospital W by examining 46 consecutive swabs from the cord stumps of infants at the time of separation.

In Hospital W during the trial, and in both hospitals at the end of the trial, nasal swabs were taken from the staff and examined for *Staph. pyogenes*. Throughout the trial swabs were taken from clinical infections wherever practicable.

The trial continued for nine months. During this time 140 infants in Hospital E were recognised as having a staphylococcal infection and received erythromycin therapy. In Hospital W 112 infants became infected, but only 80 of these were treated, receiving erythromycin and streptomycin. The smaller number treated in this hospital is explained by the fact that the pressure on accommodation enforced a shorter stay and made it impossible to retain babies for the treatment of trivial sepsis developing near the time for the mother's discharge, when suitable treatment could be given at home. About 1 of every 7 infants born in Hospital E was treated with erythromycin, and about 1 of every 10 infants born in Hospital W received erythromycin and streptomycin.

During the period of the trial no other systemic antibiotic was used in either unit. Local preparations of antibiotics were banned, the only exception being the treatment of an occasional case of conjunctivitis with chloramphenicol drops after systemic therapy had failed.

Every effort was made to record all clinical infections, however trivial. Edmunds et al. (1955) show that early recognition and early treatment of minor staphylococcal infection of the newborn play an important part in preventing serious sepsis. During the nine months of this

TABLE I—ANTIBIOTIC SENSITIVITY OF STRAINS OF *Staph. pyogenes* ISOLATED FROM CASES AND NASAL CARRIERS

Source	No. of strains	Percentage of strains resistant to						
		P	S	C	Ct	O	E	su
Cords (Hospital W)	35	86	22	20	11	14	Not tested	20
Infections (Hospital W)	65	85	22	17	9	9	0	20
Infections (Hospital E)	87	75	21	8	11	11	0	30
Nasal carriers (Hospital W)	36	84	33	14	6	6	0	30
Nasal carriers (Hospital E)	26	80	8	4	8	8	0	28

C, chloramphenicol. Ct, chlortetracycline. E, erythromycin. O, oxytetracycline. P, penicillin. S, streptomycin. su, sulphonamide.

trial no serious staphylococcal infection occurred in either unit.

Clinical Results

The incidence of clinical infection was 14% in Hospital W and 13% in Hospital E. Of the 140 babies with clinical infection in Hospital E, 89 (64%) had conjunctivitis, 19 (14%) had skin pustules, 13 (9%) had infection of the umbilical stump, 9 (6%) had local cellulitis or paronychia, and 10 (7%) were not adequately documented. The 112 cases of clinical infection in Hospital W comprised 68 cases of conjunctivitis (61%), 27 of skin pustules (24%), 4 infections of the cord stump (4%), and 13 cases of cellulitis or paronychia (11%).

Of the 140 cases treated in Hospital E, swabs were not taken in 26—chiefly minor skin infections. Of the 114 examined bacteriologically, a coagulase-positive staphylococcus was grown in 84 (74%), a coagulase-negative staphylococcus in 21 (18%), and some other organism in 9 (8%). All the 80 cases treated in Hospital W were examined bacteriologically. In 56 (70%) a coagulase-positive staphylococcus was isolated, in 20 (25%) a coagulase-negative staphylococcus, and in 2 (2·5%) other organisms. In 2 cases (2·5%) no growth was obtained.

The average duration of treatment in Hospital E was 3·5 days, with a range of 2–8 days, and in Hospital W 4·5 days, with a range of 2–9 days. In each case treatment was stopped when clinical cure was established.

TABLE II—BACTERIOPHAGE GROUP AND ANTIBIOTIC SENSITIVITY OF STRAINS OF *Staph. pyogenes*

Source	No. of strains	Phage group	No. of strains			
			PS : SS and sensitive to other antibiotics	PR : SS and sensitive to other antibiotics	PR : SR and sensitive to other antibiotics	PR : SR CR and/or CtR : OR
Cords (Hospital W)	35	Not examined	5	22	1	7
Infections (Hospital W)	65	I	4	19	4	1
		II	3	..	..	..
		III	2 (10)	15 (37)	4 (8)	9 (10)
		Not typable	1	3	..	..
Infections (Hospital E)	87	Not examined	20	49	7	9
Nasal carriers (Hospital W)	36	I	2	10	4	1
		II	..	1	1	..
		III	4 (6)	5 (18)	2 (7)	3 (5)
		Not typable	..	2	..	1
Nasal carriers (Hospital E)	26	I	2	..	..	..
		II	2	1	..	..
		III	1 (5)	13 (19)	.. (0)	1 (2)
		Not typable	..	5	..	1

CR, chloramphenicol-resistant. CtR, chlortetracycline-resistant.
OR, oxytetracycline-resistant. PR, penicillin-resistant.
PS, penicillin-sensitive. SR, streptomycin-resistant.
SS, streptomycin-sensitive.

Satisfactory control of infection was achieved rapidly in most cases. In Hospital E, 6 cases did not respond; these were all eye infections, of which 5 were associated with coagulase-positive staphylococci and 1 with an atypical *Escherichia coli*. Although local factors in the eye may delay response, we have for this study listed these cases as failures. The failure-rate for conjunctivitis was therefore 6 out of 89 cases (6·8%).

In Hospital W, 4 cases did not respond to treatment with erythromycin and streptomycin; these again were all eye infections. From 2 of them coagulase-positive staphylococci were isolated, and from the other 2 no pathogens were obtained. The failure-rate for conjunctivitis in this hospital was therefore 4 out of 45 cases (8·9%). No comparable figures are available for systemic treatment with other antibiotics, because it is our normal practice to use local antibiotic therapy predominantly for conjunctivitis.

No failures occurred in either hospital in the response of superficial and deep skin infections. No difference was recognised between the response to erythromycin alone and the response to erythromycin and streptomycin combined.

TABLE III—BACTERIOPHAGE TYPE OF STRAINS OF *Staph. pyogenes*

Bacteriophage		No. of strains isolated from		
Group	Type	Hospital W		Hospital E carriers
		Patients	Carriers	
I	52/52A	24	15	2
	Others	4	2	0
II	3A/3B/3C/51	3	2	3
III	76/77	9	2	0
	6/7/47/76/77	8	8	0
	53/73/77	6	2	1
	6/7/47/53/54/76/77	0	0	9
	7/53/73	0	0	5
	Others	7	2	0
NT	Not typable	4	3	6

Newborn infants take erythromycin readily; vomiting was noted very seldom and was never troublesome. To 1 infant four times the above dosage was given inadvertently for seven days and caused only slight vomiting. No diarrhœa was noted in treated infants. In no case did clinical thrush develop as a complication of treatment during the stay in hospital.

Bacteriology

Swabs of pus and exudate from the cases under examination, and nasal swabs from the attendants, were inoculated on to blood-agar plates with the minimum of delay. Coagulase-positive *Staph. pyogenes* were subcultured and tested for antibiotic sensitivity (Gould and Bowie 1952) and bacteriophage type (Williams and Rippon 1952). The results are shown in tables I–III.

All strains of *Staph. pyogenes* resistant to penicillin 0·15 unit per ml. were classified as penicillin-resistant, and it was found that they all produced penicillinase. Strains were also classified as resistant to streptomycin, chloramphenicol, chlortetracycline (aureomycin), and oxytetracycline (terramycin) when their minimum inhibitory concentrations exceeded 5, 10, 10, and 10 μg. per ml. respectively.

All strains of *Staph. pyogenes* were inhibited by erythromycin 0·5 μg. per ml. Since the systemic level usually attained during therapy is about 5 μg. per ml., these strains can be regarded as highly sensitive.

No strain sensitive to penicillin was resistant to any other antibiotic tested, and no strain resistant to penicillin but sensitive to streptomycin was resistant to any of the other antibiotics (table II). The strains resistant to

penicillin have been divided into three groups: (1) those which were sensitive to streptomycin and the other antibiotics; (2) those which were resistant to streptomycin but sensitive to the other antibiotics; and (3) those which were resistant to streptomycin and to one or more of the other antibiotics (table II).

Umbilical-cord Swabs (Hospital W)

Staph. pyogenes was isolated from 35 umbilical swabs (76%). The antibiotic resistance of these strains is shown in tables I and II: 5 strains (14%) were sensitive to all the antibiotics tested; 30 (86%) were resistant to penicillin, and 8 of these were resistant to streptomycin. The bacteriophage type of these strains was not determined.

Clinical Infections (Hospital W)

Staph. pyogenes was isolated from 65 cases. 10 of these strains (15%) were sensitive to all the antibiotics tested and had bacteriophage types quite different from the remainder of the strains in this particular group. 55 (85%) were penicillin-resistant, and 18 of these were also resistant to streptomycin. Most of the penicillin-resistant strains belonged to one or other of four well-defined phage-types: 52/52A, 76/77, 6/7/47/76/77, and 53/73/77 (table III).

Clinical Infections (Hospital E)

Staph. pyogenes was isolated from 84 cases. 19 of these strains (23%) were sensitive to all the antibiotics tested; 65 (77%) were penicillin-resistant, and 18 of these were also resistant to streptomycin. The bacteriophage type of these strains was not determined.

Attendant Staff in Hospital W and Hospital E

The staff of the maternity unit in Hospital W was examined on two occasions during the investigation for nasal carriage of *Staph. pyogenes*. 32 (38%) were found to be carriers. 6 of the 36 strains isolated (16%) were sensitive to all the antibiotics tested; 30 (84%) were penicillin-resistant, and 12 of these were also streptomycin-resistant. The antibiotic sensitivities and bacteriophage types corresponded to those of the strains isolated from the patients with clinical infection. The phage-types were quite different from those of the strains isolated from the staff carriers in Hospital E.

The maternity-unit staff of Hospital E was similarly examined on one occasion, and 26 (70%) were found to be nasal carriers. 5 (20%) of the strains isolated were sensitive to all the antibiotics tested, 21 (80%) were penicillin-resistant; and the majority belonged to two well-defined phage-types: 6/7/47/53/54/76/77 and 7/53/73 (table III).

Among the various groups of swabs, umbilical, nasal, and clinical infection, chloramphenicol resistance ranged from 4% to 20%, chlortetracycline resistance from 6% to 11%, and oxytetracycline resistance from 6% to 14%.

Effect of Erythromycin on Intestinal Flora

In view of the possible disturbance of the intestinal flora, specimens of fæces from 30 cases in Hospital W were examined bacteriologically. *Esch. coli* was isolated from all the specimens, and all of the strains were resistant to erythromycin 50 μg. per ml. In no case was *Staph. pyogenes* isolated.

Discussion

The limitations of this study must be clearly stated. Erythromycin was used for only nine months and only in two maternity units. The results may therefore not be generally applicable to more continued use in other circumstances. None of the nurses was treated with erythromycin during the period of the study. No local therapy was permitted; hence the chance that nurses might come into contact with the antibiotic was reduced to a minimum. Many infants were treated, but only for relatively short periods, the longest being nine days, and the question of drug resistance developing during long-continued treatment of the individual case did not arise.

Before the trial no erythromycin had been used in these hospitals; penicillin had not been used in the nurseries, for routine treatment, for over two years; streptomycin had been used sparingly during a brief outbreak of gastro-enteritis; chlortetracycline had been used regularly for a time but for the previous year had been replaced by oxytetracycline. All of these antibiotics had been given systemically, and chlortetracycline had been given locally into the eye. Chloramphenicol had been used regularly for the local treatment of neonatal ophthalmia, having taken the place of sulphacetamide solution for this purpose. It is against this background that the results of the sensitivity tests must be assessed. It should also be noted that both maternity units are parts of general hospitals, and that there is a limited exchange of medical and domestic staff between them and other parts of the hospital.

Erythromycin has proved useful in the treatment of staphylococcal infection and, where systemic therapy is indicated, appears to be as effective as other antibiotics. It has at the moment a particular place in the treatment of staphylococcal infection in which other antibiotics have failed owing to drug resistance. It is more successful in the management of skin sepsis than in the control of conjunctivitis, where it failed in about 8% of cases.

In most cases of conjunctivitis, which is the commonest type of staphylococcal infection of the newborn, systemic therapy is not indicated. Local therapy probably has a lower failure-rate, acts more quickly, and can be discontinued sooner. For this we use chloramphenicol, which has the advantage that complete resistance of the staphylococcus to it seldom develops (Finland 1953), and cross-resistance between it and other antibiotics is seldom observed (Fusillo et al. 1953).

On the basis of in-vitro tests a high sensitivity-rate of the staphylococcus to erythromycin has been shown. In Edinburgh, before this investigation, we had not observed a naturally occurring erythromycin-resistant strain of *Staph. pyogenes*, and during the nine months of this trial no erythromycin-resistant strains emerged. Important factors contributing to this were (we believe) restricted use, adequate dosage, and careful technique in handling the antibiotic, whereby the likelihood of bacterial resistance developing quickly was reduced.

Our experience has been in striking contradistinction to that of Lepper et al. (1953), who found that, within a month of the adoption of erythromycin for general use in a hospital, strains of staphylococci resistant to it began to appear in the nose and throat of the staff, and that after five months the carrier-rate of highly resistant strains had reached 75%. Encouraging as our results with erythromycin appear, and without detracting from the value of this new chemotherapeutic agent in the treatment of staphylococcal infection, one must appreciate the fact that all the strains isolated in this series were distributed between only a few phage-types. This means that the number of strains dealt with was in reality very limited. Had erythromycin-resistance developed in *one* of our phage-types, it would have appeared that all cases infected with this particular type had developed resistance, and this might have produced a high resistance-rate. At the same time some of the phage-types persisted throughout the trial, and these showed no evidence of developing erythromycin resistance.

Resistance to any antibiotic other than penicillin was always accompanied by penicillin resistance. Others have reported similar findings. Finland and Haight (1953), for instance, note that it is exceptional to find a strain of *Staph. pyogenes* resistant to chlortetracycline and oxytetracycline that is not also resistant to penicillin. Apparently there is some relationship between penicillinase-production and resistance to other antibiotics; and in hospitals, where penicillinase-producers are so common, this relationship is likely to be important. The

reservoir of staphylococci among carriers in the population outside hospital still appears to consist largely of organisms sensitive to penicillin, and, if continuous selection by exposure to antibiotics could be avoided, these might be expected to take the place of hospital strains.

In Hospital W, three years ago, a series of swabs exactly similar to that taken in the present investigation—from the umbilicus and from clinical infections of the infant, and from the nares of the staff—was examined (Forfar et al. 1953). It is of some interest to compare the antibiotic sensitivity of staphylococci over this three-year period. If, as the level of significance, we accept two and a half times the standard error of the percentages cited, and if we compare staphylococci isolated from corresponding sites, we find that there has been no significant increase or decrease in resistance to penicillin, chloramphenicol, or chlortetracycline. As regards the staphylococci carried by the staff, however, there has been a significant increase in streptomycin resistance. In similarly comparing corresponding groups of swabs taken during the present investigation in Hospital W and in Hospital E we find that the only significant difference is between the staffs—the staphylococci carried by the staff in Hospital W again showing a significant increase in streptomycin resistance. This higher incidence of resistance to streptomycin in Hospital W may be related to the greatly increased handling of that antibiotic by the nurses of the hospital during the trial, owing to its routine use there.

There is ample evidence of cross-infection, in the cases investigated, by either direct or indirect contact with carriers or cases. The number of penicillin-resistant strains among both carriers and patients is striking; and, again, the most common sensitivity pattern (penicillin-resistant: streptomycin-sensitive) is very evident in both. The evidence for cross-infection is strengthened by the results of phage-typing: not only do all the strains isolated fall into four distinct types but also particular phage patterns are common to both patients and carriers. It therefore appears that the cases were infected inside hospital from staphylococcal carriers in contact with patients or from other patients.

In a few cases infection was by penicillin-sensitive strains with a phage pattern similar to that of strains encountered outside hospital. Possibly the infection was maternal in origin; but, as some members of the staff also carried non-hospital strains, it could equally well have come from the staff.

The natural resistance of all *Esch. coli* isolated from the fæces seems to show that the normal intestinal flora is not upset by erythromycin, given for a short time (five days) in the dosage used.

Summary

In one maternity unit 140 cases of neonatal staphylococcal infection were treated with erythromycin. In another unit 80 cases were treated with erythromycin and streptomycin.

The average duration of treatment was about four days, with a range of two to nine days. There were no failures in the treatment of deep and superficial skin sepsis, but 8% of cases of conjunctivitis did not respond. Erythromycin with streptomycin proved no more effective than erythromycin alone.

Phage-typing showed that a limited number of strains were responsible for the cases of clinical infection.

No strain of *Staph. pyogenes* developed resistance to erythromycin during the trial. The extent of resistance to five other antibiotics and to sulphonamide is shown.

Strains of the same antibiotic resistance pattern and phage-type were isolated from the babies and from the staff, showing that there was free interchange of staphylococci between staff and infants and between one infant and another, and that cross-infection was common.

The increased use of streptomycin in one unit during the trial appeared to increase the proportion of streptomycin-resistant organisms among staphylococci isolated from staff nasal carriers in that unit.

Erythromycin did not interfere with the normal growth of *Esch. coli* in the gut, and no case of fungus or staphylococcal infection of the alimentary tract was found.

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CŒLIAC DISEASE

RESULTS OF LATE TREATMENT WITH GLUTEN-FREE WHEAT DIET

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THE introduction of diets free from wheat gluten and rye gluten (Dicke 1950, Weijers and van de Kamer 1950) has not only simplified the treatment of cœliac disease but has also ensured that children with this disease grow at an optimal rate (Anderson et al. 1952, Sheldon and Lawson 1952).

The reintroduction of wheat gluten into the diet leads to a gradual return of symptoms and a slowing down of the rate of growth (Dicke 1950, Anderson et al. 1952). Merely slackening strict dietary control reduces the rate of growth, even if other symptoms are absent (Sheldon and Lawson 1952, Gerrard et al. 1955).

In a previous study (Gerrard et al. 1955) we reinvestigated 32 children and adolescents who had been diagnosed as having cœliac disease in early childhood and had not been treated with gluten-free wheat. None of them was completely free from symptoms, but the symptoms were usually milder than initially. Steatorrhœa, stunted growth, and anæmia were the commonest residual clinical findings.

We report here the response of these older children to late treatment with a diet free from wheat gluten.

Patients and Methods of Investigation

Since management of the diet was to be the responsibility of the parents, their full coöperation was necessary. When the results of the above-mentioned investigations became known, the parents were given our findings and told that dietary treatment on modern lines could eradi-

cate persisting symptoms and would probably ensure a more normal rate of growth and development. They were warned that the diet was not easy to prepare, for it entailed the exclusion of many palatable foods and necessitated the baking of bread at home with specially prepared wheat-starch. They were also warned to expect not a dramatic change in their child's condition but a gradual improvement during three months; for this reason they were asked not to decide on the efficacy of the diet until it had been tried for at least three months.

The parents of 22 patients decided to try the effect of the diet: 4 of the patients remained on the diet for less than four months and have therefore been considered separately as defaulters. The remaining 18, aged from 4 years to 16, included the most severe cases; they were losing an average of 8·3 g. of fat daily in their stools, in contrast with a daily average loss of 7·0 g. for the whole series of 32 children.

Two main criteria were used for assessing the results of the diet: growth estimated by measurement of height and weight, and the fat-content of the fæces. These investigations were made before treatment with gluten-free wheat and after at least four months on the diet, the length of treatment at the time of reassessment ranging from four to twenty-five months.

Growth

Heights and weights were compared with the normal standards of Engelbach (1932) adapted by Wilkins (1950); for each child the percentage of the average weight and height for age was calculated.

Output of Fat in Fæces

It was impossible to study fat-balance in most of the children, because they were outpatients and their intake of dietary fat could not be accurately calculated. For estimation of fat in the fæces complete five-day collections of stools were obtained from all 18 children before treatment with the diet, and again from 16 of these at the time of reassessment. The fat-content of the fæces was estimated by a modification of the method described by van de Kamer et al. (1949). Controls were obtained by investigating a five-day fæcal output of fat in each of 20 children in hospital convalescent from parenteral disorders and receiving the ordinary ward diet. The average daily output of fat by each child was calculated from the five-day figures.

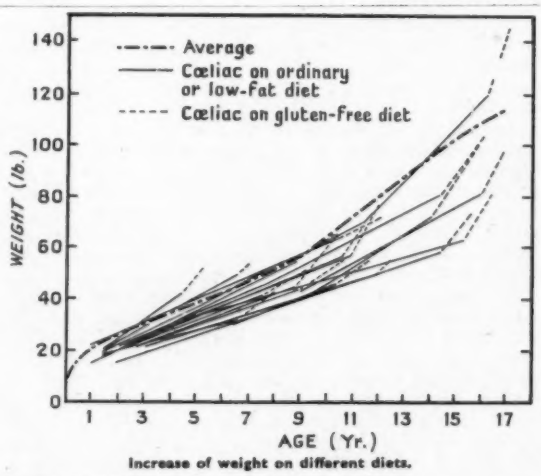
Results

Growth in Weight and Height

When these children were initially reviewed, there was no reason to suspect that any was receiving an inadequate diet in the accepted meaning of the term; nor was anorexia a common persisting symptom. Nevertheless on the new régime all 18 children began to gain weight and to grow in height more rapidly than before. The accompanying table shows that, after a mean period of fourteen months on the diet, the mean percentage weight had increased from 82·7 to 92·8%, and the mean percentage height from 90·5 to 92·7%. These differences are significant: $P<0.001$ for both weight and height. To make up so much of their earlier deficit so quickly they had, on average, gained in weight at two and a half times, and in height at twice, their previous rate. The sudden alteration in the weight-gradient of each child after being put on the diet is shown in the accompanying figure. The steep rise in the rate of growth will obviously flatten out as weights and heights approach normal.

Output of Fat in Fæces

The table shows that before treatment the daily output of fat by the children ranged from 4·1 to 14 g. (mean 8·3 g.). At the time of reassessment on the diet the corresponding figures were 1·2–4·8 g. (mean 3·4 g.). These values were similar to those found in the 20 "normal" children: 1·4–4·6 g. (mean 2·7 g.). The decrease in the fat-content of the stools on gluten-free wheat is again statistically significant ($P<0.001$).



Increase of weight on different diets.

Other Factors

The increased rate of growth and the diminution of the fat-content of the stools are factors which could be easily measured, but other less tangible improvements were noted both by us and by our patients.

A girl, aged 16, noticed that her finger-nails required cutting every five or six days instead of once a fortnight as previously, and that her hair also needed cutting much more frequently. Others, on direct questioning, noted more rapid growth of nails and hair. In addition one girl, aged 7 years, who initially had dry and rather scanty hair, developed a thick glossy growth while on the new diet.

Two patients were troubled with furunculosis, possibly due either to better and more rapid assimilation of carbohydrates or to the onset of puberty.

Two girls, both aged 16, started to menstruate six weeks and twelve months after being put on the diet. In one of these girls, who was still in hospital on a daily fat-balance, menstruation was associated with an immediate but temporary diarrhœa and steatorrhœa; this disturbance of intestinal function recurred regularly with succeeding menstrual periods.

The vitality and demeanour of all the patients improved; the more obvious the persisting symptoms had been the more striking was this improvement.

Defaulters

3 of the 4 patients who abandoned the diet before four months' trial were aged more than 15; they found that

EFFECT OF GLUTEN-FREE WHEAT ON GROWTH AND ON OUTPUT OF FAT IN FÆCES

Case	Age		Period on gluten-free wheat (mos.)	Percentage weight for age		Percentage height for age		Average fæcal fat (g. per day)	
	A	B		A	B	A	B	A	B
	Yr. Mos.	Yr. Mos.							
1	4 7	5 3	8	119·0	133·0	103·0	102·0	6·6	2·9
2	6 5	7 0	7	109·0	112·0	98·0	98·5	9·4	Not done
3	6 8	7 11	15	70·0	84·0	81·0	83·0	5·5	4·3
4	7 6	9 0	18	85·0	91·0	89·0	90·0	6·6	3·9
5	8 10	10 3	17	80·5	99·0	94·0	97·0	8·5	4·1
6	8 10	10 2	16	97·0	102·0	93·0	93·5	8·5	2·1
7	9 0	10 10	22	76·0	82·0	92·0	93·5	10·0	3·6
8	10 3	11 9	18	70·0	71·5	84·0	87·5	14·0	4·5
9	10 7	11 4	9	84·0	94·5	86·0	89·0	14·0	3·8
10	10 8	12 2	16	93·5	92·0	92·0	92·5	4·1	1·5
11	11 1	12 0	11	81·0	99·5	88·0	91·0	5·0	4·8
12	11 11	12 3	4	65·0	69·0	84·0	85·0	7·3	1·2
13	14 0	16 1	25	72·0	95·0	91·0	96·5	12·3	4·0
14	14 4	15 7	15	62·5	71·0	83·0	88·0	11·8	2·3
15	14 7	15 10	15	78·5	91·5	97·0	100·0	4·6	Not done
16	15 3	16 5	14	59·5	71·5	80·0	85·0	10·0	3·0
17	16 0	16 10	10	75·0	87·0	94·0	96·0	6·4	4·0
18	16 1	17 0	11	111·0	125·0	101·0	101·0	4·9	4·6
	Mean		14	82·7	92·8	90·5	92·7	8·3	3·4

A, before treatment with gluten-free wheat.
B, at time of assessment on gluten-free wheat.

it interfered with their social activities. Nevertheless all 4 had improved on the régime, and their parents were delighted with the response :

A girl, aged 19, had initially Hb 7·3 g. per 100 ml. ; this increased to 13·7 g. per 100 ml. five months after the start of treatment by diet and with oral iron.

A boy, aged 16, who had been lacking in vitality, gained 6 lb. in two months and developed so much energy that he joined a local cycling-club.

A girl, aged 14, put on 7 lb. and $1^1/_2$ inches in height in three months and became livelier.

Discussion

The present study has shown that children and adolescents who have had cœliac disease for many years still respond well to a diet free from wheat gluten. It is thus evident that this diet is effective not only in the active phase of cœliac disease, which is usually seen in early childhood, but also in the latent or quiescent phase, which is more commonly found in later childhood. The increased rate of growth observed in the present study underlines the importance of keeping these children on this diet at least until active growth and development have ceased. In some cases it may even be necessary to maintain the diet into adult life, in view of the findings of Cooke et al. (1953), who obtained a history of cœliac disease in childhold from many adults with idiopathic steatorrhœa.

The increased rate of growth on gluten-free wheat may have been partially due to an increased caloric intake associated with an improvement in appetite. That this was not the sole reason was apparent from the concomitant reduction in the output of fat in the fæces, wnich indicated an improvement in absorption of fat. Anderson et al. (1952) have shown that the reduction in fæcal fat in cœliac disease after the start of treatment with a diet free from wheat gluten, is associated with a rise in the chylomicrograph count, an increase in the glucose-tolerance test, and a diminution in dilatation of the small intestine. All these findings indicate that there is a return of gastro-intestinal function to a more normal state.

During the progress of the work previously reported (Gerrard et al. 1955) and the present study 2 children were observed whose symptoms of cœliac disease dated from the neonatal period—i.e., before they had begun to ingest wheat-containing foods. Although these 2 children had normal pancreatic function, associated with steatorrhœa, they did not respond to gluten-free wheat. In view of the early onset and their lack of response to the diet it seemed probable that the ætiology in these 2 cases was different. They have therefore been excluded from the present study.

Summary

The effect of a diet free from wheat gluten was investigated in 18 children and adolescents who had been diagnosed as having cœliac disease three to fourteen years previously and had not recovered on diets containing wheat flour.

During periods of from four to twenty-five months on the diet there was a striking acceleration of growth in weight and in height accompanied by disappearance of steatorrhœa.

It is concluded that a diet free from wheat gluten is beneficial in both the active and the latent phases of cœliac disease.

We wish to thank the consultant staff of the Children's Hospital, Birmingham, for permission to study their patients ; Prof. A. C. Frazer for his interest and encouragement ; Dr. J. M. French for helpful advice and criticism ; Dr. J. A. H. Waterhouse for statistical analysis ; and Miss M. Cutler for technical assistance. Finally we gratefully acknowledge financial assistance from the United Birmingham Hospitals Research Fund, the Medical Research Council, and Messrs. Cow & Gate.

References at foot of next column

SICKLE-CELL TRAIT IN SOUTH TURKEY

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AT Mersin, on the southern coast of Turkey, 15 cases of sickle-cell anæmia were found in a distinct and separate community of eleven families (Aksoy 1955) ; the patients included four pairs of siblings. It was therefore interesting to determine the incidence of sickle-cell trait in this community, whose ancestors had been immigrants to Turkey from Syria and Egypt several centuries ago and, so far as is known, had no Negro blood but had intermarried among themselves, becoming inbred.

Method

The Scriver-Waugh technique (Wintrobe 1951) was used, at least two blood slides being made for each person.

Results

The blood was examined of 376 persons comprising two groups : medical outpatients of Mersin State Hospital and their healthy relations ; and some of the inhabitants of a small village, Çatalkeli, near Tarsus. For controls we used 200 persons who did not belong to this community. Of the 376 persons 50 had sickle-cell trait (table I).

TABLE I—INCIDENCE OF SICKLE-CELL TRAIT

Group	No. tested	No. with sickle-cell trait
Mersin city and vicinity ..	181	25 (*13·8* %)
Çatalkeli	195	25 (*12·8* %)
Total	376	50 (*13·3* %)
Controls	200	0

The persons tested were predominantly adults, but the second group consisted mainly of school-children ; their ages ranged from 9 months to 72 years. The numbers of males and of females were about equal.

TABLE II—PERCENTAGES OF SICKLE-CELLS IN FIFTY PERSONS WITH SICKLE-CELL TRAIT

Percentage of sickle-cells	No. of persons
20–30	2
30–40	9
40–50	13
50–60	6
60–70	8
70–80	12
Total	50

The sickling phenomenon was usually positive before twenty-four hours but sometimes started in three or four hours. We got no positive results after the sickling phenomenon had been negative for twenty-four hours and therefore do not expect any change after this period of time. This observation confirms that of Watson et al.

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(1948). The percentages of sickle-cells found in the 50 cases of sickle-cell trait are shown in table II.

Discussion

The present investigation showed a fairly high incidence (13·3%) of sickle-cell trait. This result is important not only because the people are white but also because it is the highest incidence of sickle-cell trait found outside Africa (Jelliffe et al. 1954, Neel 1951, Singer 1951) except in some tribes of Southern India (Lehmann and Cutbush 1952a and b). Caminopetros (1952) reported the very high incidence of 49·1% in Athens, but this has been disputed by Lehmann (1952) and Choremis (1952).

A high incidence of sickle-cell anæmia has also been reported from Greece (Choremis et al. 1951) and Italy (Silvestroni and Bianco 1952), but never have so many cases of sickle-cell anæmia been found in a white community as in that of Southern Turkey. All other cases of sickle-cell anæmia in the white race have been isolated ones (Cooley and Lee 1929, Rosenfeld and Pincus 1932, Clarke 1933, Haden and Evans 1937, Johnson and Townsend 1937, Cooke and Mack 1934, Weiner 1937, Greenwald and Burrett 1940, Mallory 1943, Ogden 1943, Guyton and Heinle 1950, Abbasy 1951).

The fairly high incidence of sickle-cell trait in the Turkish community reported here is expected from Neel's genetic theory for sickle-cell anæmia and for sickle-cell trait (Neel 1949, 1951, 1952).

How can we explain this fairly high incidence of sickle-cell trait in the white community? At present the two most widely held opinions are as follows:

(1) There was an admixture of Negro blood during either the Roman or the Turkish empires, or else in the era of medieval Mohammedan expansion.

(2) Sickle-cell trait spread to East Africa by the immigration of tribes from India (Lehmann and Cutbush 1952a and b). Jelliffe et al. (1954) suggest that sickle-cell trait may have spread from India to other places also, including the Mediterranean countries.

Both of these explanations may fit the incidence of sickle-cell trait in Southern Turkey. To determine which of them is the better in the present case a thorough investigation of blood-groups should be undertaken, as was done in Southern India by Lehmann and Cutbush (1952a and b).

Summary

In 376 persons belonging to a distinct and separate community in Southern Turkey the incidence of sickle-cell trait was 13·3%.

The possible explanations of this high incidence of sickle-cell trait in a white community are discussed.

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ŒSOPHAGEAL REFLUX AND THE ACTION OF CARMINATIVES

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ŒSOPHAGEAL reflux is common, but its mechanism is obscure. In patients with symptoms of reflux it depends on the relative positions of the structures forming the cardia, for it takes place only during inspiration and more commonly in some postures than others (Creamer 1955). Nevertheless the normal cardia is competent under these conditions, and even when hiatus herniation is present there may be no reflux. Clearly there must be some change at the cardia that renders it susceptible to these positional factors.

In an attempt to define this change a search was made for drugs that would produce reflux in healthy people. O'Mullane (1954) has shown that local and general anæsthesia, ganglion-blocking agents, and muscle relaxants are all without effect on the competence of the cardia. Since the same changes in pressure take place whether gas or fluid is refluxed from the stomach, the action of carminatives on the cardia was investigated. The following observations are based on recordings of intra-œsophageal and intragastric pressures and on direct observation of the action of carminatives on the gastric mucosa by gastroscopy.

Methods

The intra-œsophageal and intragastric pressures were measured through fine 'Polythene' tubes by Hansen capacitance manometers (Dornhorst et al. 1954a). In these experiments the recording apertures were 5 cm. apart, and the tubes were so placed that one lay in the stomach and two in the œsophagus. In each experiment control observations were made with the subject in various postures to test the competence of the cardia before giving carminatives. In all the subjects tested the cardia was shown to be competent. After the subject had drunk the carminatives, continuous recordings of the pressures were made for fifteen minutes. 10 healthy people and 6 patients with some specific abnormality were examined.

The gastroscopic observations were made on 6 patients undergoing routine investigations for symptoms of dyspepsia. The carminatives were introduced into the stomach through a fine polythene tube attached to the gastroscope. These patients were premedicated with 'Omnopon' and hyoscine (for details of local anæsthesia see below).

Carminatives.—These drugs belong to the group of volatile oils, and most of the commonly used preparations are alcoholic solutions. The following preparations were investigated:

(1) Tinct. cardamom. co. *B.P. 1953.*
(2) Tinct. cardamom. aromat. *B.P.C. 1949.*
(3) Aq. anethi. conc. *B.P. 1948.*
(4) An emulsion of oil of dill in water.

These were used in the *B.P.* dosage. All were found to have the same effect, excluding that of the alcohol present in the tinctures.

Results

When carminatives are given to a healthy person, there follows a constant pattern of events. Almost at once a sensation of warmth is felt in the epigastrium and sometimes also in the substernal region. After two to five minutes this is followed by a sensation of distension in the epigastrium and a desire to belch. This is variously described as flatulence, wind, or feeling blown out. In the erect posture eructation takes place in almost every

case within fifteen minutes of taking the drug. After this time the sensation of distension disappears. Eructation is almost as sensitive an index of the action of carminatives as are intra-œsophageal recordings, and was used in a few cases to confirm the results.

Pressure Observations

The changes which take place in intra-œsophageal pressure in cases of œsophageal reflux have already been described (Creamer 1955). After the carminative had been administered, no change was observed in the intragastric pressure in any case. In those cases in which the carminative acted, the pressure changes of œsophageal reflux were observed from five to fifteen minutes after administration of the drug (fig. 1). They were identical with those recorded from patients with œsophageal reflux and occurred in the same positions and with the same respiratory timing. Often the reflux was recorded with two or three respirations only, and it rarely lasted for longer than five minutes. Whether gas or fluid was refluxed depended on the position of the subjects, and the œsophageal reaction was the same as that previously described. The results of these experiments are summarised in the accompanying table.

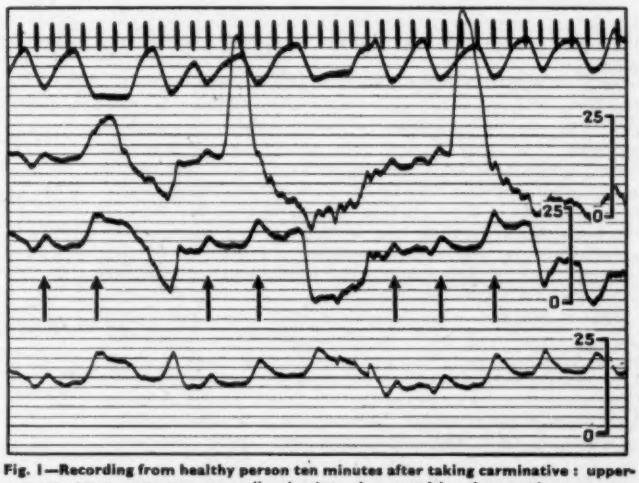

Fig. 1—Recording from healthy person ten minutes after taking carminative: uppermost trace, pneumogram (inspiration downwards); lower three traces, recordings from tubes 5 cm. apart (top two tubes in œsophagus and bottom tube in stomach); arrows, reflux waves. Two propulsive waves are initiated by presence of refluxed fluid in œsophagus.

The changes of reflux were found in 9 of 10 healthy people. The one person who gave a negative result declared that she had never noticed eructation in her life.

RESULTS OF MEASUREMENT OF INTRA-ŒSOPHAGEAL PRESSURE AFTER ADMINISTRATION OF CARMINATIVES

Cases	No.	Reflux	No change
Healthy people	10	9	1
Œsophageal muscular atrophy ..	2	2	..
Gastric mucosal atrophy	2	..	2
Competent hiatus hernia	1	1	..
Paralysed left diaphragm	1	..	1

One patient with a hiatus hernia but without reflux was given carminatives and produced the changes of reflux in exactly the same way as the healthy people. One patient with paralysis of the left diaphragm showed no change after carminatives and said that eructation had ceased since the onset of the paralysis. This is of interest because reflux takes place only during inspiration and is probably precipitated by the changing shape of the cardia with the descending diaphragm.

2 patients with œsophageal atrophy due to scleroderma, confirmed by barium and pressure studies (Dornhorst et al. 1954b), reacted normally to carminatives with reflux, which fact suggests that the œsophageal muscle plays no part in the reflux mechanism. 2 patients with gastric mucosal atrophy due to pernicious anæmia did not react to carminatives, and 2 further patients with pernicious anæmia who were given carminatives without pressure recordings did not belch. Moreover patients with pernicious anæmia do not have the sensation of distension after carminatives.

Gastroscopic Observations

3 cases in which the local anæsthesia consisted in spraying the throat only with 2% lignocaine showed definite mucosal changes after the introduction of carminatives. After five minutes the area around the resting juice became a deeper red, and the rugæ became more prominent and the surface granular owing to an increase in size of the gastric areas. No movements of the rugæ were seen. Of 3 other patients, who were anæsthetised by sucking amethocaine tablets and swallowing the juice, which presumably anæsthetises the gastric mucosa, 2 showed milder changes and the 3rd none.

These observations show that carminatives cause hyperæmia of the gastric mucosa, and the lesser reaction after local anæsthesia of the mucosa suggests that it is partly mediated through an axon-reflex. This action is not surprising, because many carminatives are mild counter-irritants, and some oils in the same group, such as turpentine, possess strong rubifacient properties.

Discussion

Action of Carminatives

Previous work on the action of carminatives has been focused on motility studies (Gunn 1920, Plant 1920, Plant and Miller 1926), which showed that carminatives

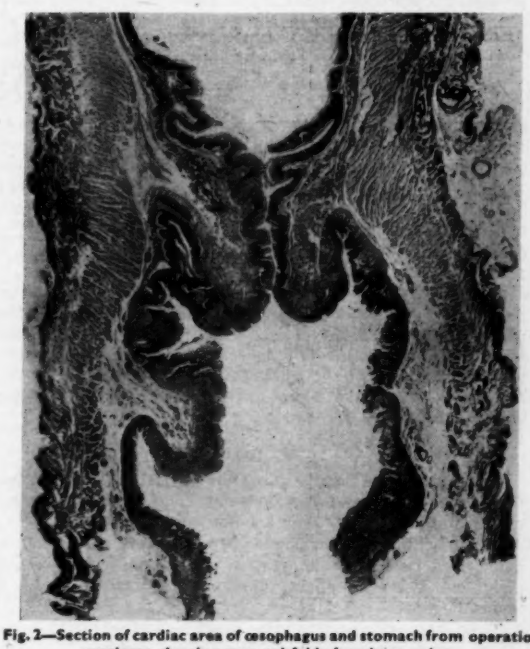

Fig. 2—Section of cardiac area of œsophagus and stomach from operation specimen showing mucosal folds forming a valve.

decreased motility and "tone" of the stomach in laboratory animals. From this it was deduced that the "cardiac sphincter" was relaxed and eructation took place.

The mechanism of the normal cardia has been investigated by Dornhorst et al. (1954a), who show that the cardia is guarded by a valve. The only structure capable of forming a valve in this area is the gastric mucosa, which appears to be drawn together by the muscularis mucosæ in a purse-string manner; moreover the muscularis mucosæ is thickened in this area (fig. 2). These workers showed that participation by extragastric structures was unnecessary for the competence of the cardia, and it is well known that there is no anatomical evidence of a sphincter.

There are two components of this valve on which carminatives could have an effect—the mucosa and the muscularis mucosæ. The gastroscopic observations show that carminatives cause hyperæmia of the gastric mucosa. This change must increase the thickness of the mucosa and make it more turgid. Any decrease in the mobility of the mucosa about the cardia will hinder the neat apposition of mucosal folds to form the valve.

Little is known of the behaviour of the muscularis mucosæ, but the observations on patients with the gastric atrophy of pernicious anæmia suggest that it plays little part in the action of carminatives. In spite of mucosal and muscular atrophy the muscularis mucosæ appears normal at the cardia in this condition (H. A. Magnus, personal communication). The failure of carminatives to act in these cases suggests that the mucosa is at fault and, owing to atrophy, cannot become sufficiently hyperæmic to affect the valve mechanism.

Carminatives must therefore act on the cardia by altering the mucosal pliability, with the result that, with the changing shape of the cardia on posture and inspiration, the valve occasionally opens and allows reflux.

Œsophageal Reflux

These observations on the action of carminatives show one way in which the cardia can be rendered incompetent. It is reasonable to suggest that this mechanism underlies reflux from other causes. Essentially it depends on a change of the physical characteristics of gastric mucosa making it less pliable. This may be hyperæmia, as in the case of carminatives; an increase in the number of mucosal cells, as in hypersecretion; infiltration of the mucosa with inflammatory exudate, as in gastritis; or infiltration with neoplastic tissue. Minor degrees of reflux are common after a meal, and this can be reasonably attributed to hyperæmia of the mucosa. A large proportion of cases of hiatus hernia with reflux have increased gastric secretion (Belsey 1952), and here the increased thickness of the mucosa may be a contributory factor in opening the cardia. Eructation is a prominent symptom in the syndrome of chronic atrophic gastritis, where inflammatory exudate and increased collagen alter the mucosa, as opposed to the gastric atrophy of pernicious anæmia, where there is no inflammatory exudate. The scanty gastric secretion in this condition probably prevents œsophagitis. Finally, reflux is commonly found with neoplasms infiltrating the mucosa about the cardia.

Summary

Recordings of intra-œsophageal and intragastric pressures show that carminatives cause œsophageal reflux similar to that in pathological states.

Gastroscopic observations reveal that carminatives cause hyperæmia of the gastric mucosa, and evidence is produced that the effect on the muscularis mucosæ is insignificant.

This mucosal hyperæmia must interfere with neat closure of the mucosal valve and allow reflux.

This mechanism may underlie other states of reflux where the pliability of the mucosa is decreased from other causes.

I wish to thank Mr. R. W. Halls and Mr. M. G. Ventom for technical assistance, Dr. R. H. Thomlinson for permission to publish fig. 2, and Mr. A. E. Clark for the photograph.

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EFFECT OF PIPERAZINE DERIVATIVES ON CERTAIN INTESTINAL HELMINTHS

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A SURVEY undertaken to ascertain the incidence of roundworm and hookworm infestation of children in certain coastal areas of New South Wales led to an effort to find methods of treatment less toxic and difficult than those in vogue that might safely be used in routine mass therapy.

Investigation

The drugs tested were diethylcarbamazine (diethyl carbamyl methyl piperazine dihydrogen citrate, 'Hetrazan,' 'Banocide'), piperazine hydrate ('Antipar'), and piperazine adipate ('Entacyl').

The patients were children aged from 1 to 14 years, and the tests for ova were made by the salt flotation method.

The highest egg-counts before treatment were ascaris 153,000, necator 54,000, and trichocephalus 13,000 per g. of fæces.

Results

The results obtained with *Ascaris lumbricoides* and *Trichocephalus dispar* are set out in the accompanying table.

Necator americanus.—41 children treated with diethylcarbamazine, 28 with piperazine hydrate, and 7 with piperazine adipate showed no change in egg-counts.

Hymenolepis nana.—4 children treated with piperazine adipate were unaffected.

In the cases not cured by piperazine adipate the ova of both ascaris and trichocephalus were extremely scanty after treatment.

RESULTS OF TREATMENT

Drug	Daily dose (mg.)	Duration of treatment (days)	No. of children treated	No. of children ova-free 2½ weeks after treatment
Ascaris lumbricoides:				
Diethyl carbamazine	13 per kg. of body-weight	3	54	12 (*22%*)
Piperazine hydrate	75 per kg. of body-weight	3	26	20 (*77%*)
Piperazine adipate	300 per yr. of age (max. 1800 [about 75 per kg. of body-weight])	3	47	45 (*95%*)
Trichocephalus dispar (*Trichuris trichiura*):				
Piperazine hydrate	75 per kg. of body-weight	3	22	4 (*18%*)
Piperazine adipate	300 per yr. of age (max. 1800)	3	31	28 (*90%*)

The maximum number of ascarids passed was 59.

Children treated with the soluble hydrate passed most of their worms early on the second day of treatment, whereas with the more insoluble adipate their evacuation extended to the third and even fourth day, and in multiple infestations trichocephalus was voided earlier than ascaris.

No toxic or unpleasant reactions occurred except with diethylcarbamazine, which was too toxic to give in effective dosage.

The daily dose in every case was given as a single dose and not divided as recommended by the manufacturers. No aperients were given.

Some children with ascariasis were given trial daily doses of piperazine hydrate 25–55 mg. per kg. of bodyweight over one, two, or three days. The results were very variable: a single dose of 25 mg. per kg. of bodyweight was sufficient in some cases to cause disappearance of ova, whereas in others this amount was quite ineffective. Factors such as amount of food intake may have affected the result.

Comments

The results of treatment show that diethylcarbamazine is unsatisfactory in the treatment of ascariasis.

Piperazine hydrate is effective against ascaris in a large proportion of cases but not against trichocephalus, whereas piperazine adipate has the advantage of being most effective against both ascaris and trichocephalus —the latter a parasite found resistant to older forms of treatment.

The absence of toxic reactions suggests that further tests may show that more massive and fewer doses will be both safe and effective.

Regulation of food intake or premedication may also enhance the action of piperazine adipate.

Further investigation is being undertaken.

THROMBOCYTOPENIA DUE TO PLATELET AGGLUTININS IN THE NEWBORN

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THE antibody mechanism of some secondary thrombocytopenias is well known—e.g., purpura due to 'Sedormid' (Ackroyd 1949) and to quinidine (Broch 1941, Nudelman et al. 1948, Norcross 1950, Hirsch and Dameshek 1950, Collins 1950, Larson 1953). Since the report published by Evans et al. (1951) several workers have brought forward facts suggesting an antibody mechanism in some of the so-called idiopathic thrombocytopenias; but there was no definite proof before anti-platelet agglutinins were shown to exist.

There are many objections to the earlier techniques devised to demonstrate platelet-destroying factors. All of them are based on the agglutination of healthy platelets which have been lysed by contact with an unknown serum. The main difficulties are the tendency for thrombocytes to agglutinate spontaneously, and the fact that the combination of serum and thrombocytes may in some instances liberate thrombin, which in turn produces clotting. Many precautions are therefore necessary; these we have discussed elsewhere (Verstraete and Vandenbroucke 1955).

Methods

Besides the direct method, one can use the indirect Coombs test or human anti-platelet serum (Nolthenius et al. 1953), or a modification of the Middlebrook-Dubos hæmo-agglutination method (Kissmeyer-Nielsen 1953). We used the first and the last of these methods in a case of thrombocytopenia.

The principle of the Kissmeyer-Nielsen method is the fixation of the antigen by the red blood-cells (the platelet extract being the antigen in the present case).

Reagents

The red cells are first preactivated to facilitate the adsorption of proteins on their surface as follows:

A 2% suspension of group-O red cells in buffered saline solution (pH 7·2) is incubated at room-temperature for 10 minutes with an equal volume of a freshly prepared tannic-acid solution (1/40,000 in saline solution). The red cells are next washed in buffered saline serum of pH 7·2 and brought again to a 2% suspension in saline solution (0·85 g. NaCl%).

The platelet extract is prepared as follows:

The platelets are precipitated by fractional centrifugation of citrated healthy plasma. They are next suspended in saline solution (about 600,000 per c.mm.) and frozen at —4°C and defrosted several times. After centrifugation the supernatant liquid is decanted and preserved as the platelet extract.

The suspension of red cells is added to the buffered (pH 6·5) platelet extract (vol. 1 : 1), and left at room-temperature for 10 minutes. The red cells are next separated by centrifugation, washed twice with a mixture of saline solution and 1% or 2% human serum, and suspended in the same liquid to make a 1% suspension. A little serum is added to prevent hæmolysis.

The Test

A known amount of the serum to be tested (or an aliquot if the titre has to be determined) is mixed with the same quantity, volume for volume, of sensitised red cells in a series of hæmolysis-tubes. The tubes are then shaken for 30 minutes and examined for agglutination at the end of 2 hours and 24 hours. If hæmo-agglutination has taken place, the test is positive.

Case-report

A young mother, aged 27, had bled easily since childhood but never seriously enough to require medical attention, and she had borne three children without undue trouble. Spontaneous ecchymoses began to appear in 1951, but were not given any serious thought until May, 1953, when long-continued epistaxis led her to consult a doctor.

On examination she was two months pregnant and otherwise healthy except for slight anæmia. No glands were palpable, and the spleen and the liver were of normal size. A blood-count showed Hb 80%, red cells 3,600,000 per c.mm., white cells 10,800 per c.mm. (neutrophils 55%, eosinophils 3%, basophils 0, lymphocytes 36%, monocytes 6%). The erythrocyte-sedimentation rate was normal. The plasma-bilirubin level was 0·6 mg. per 100 ml. and bleeding-time 6 min. There were 46,800 platelets per c.mm. Bone-marrow showed a normal distribution of blood elements, young and adult megakaryocytes in particular being present in normal proportions.

Operation.—Because of the severe thrombocytopenia and the increasing hæmorrhages splenectomy was done to avoid accidents at parturition. A normal spleen was removed in October, 1953, no accessory spleens being found. A few days after the splenectomy the number of platelets increased to 300,000 per c.mm.

Parturition.—A baby weighing 7 lb. was born two months later, delivery being uneventful. The baby was healthy, except for numerous petechiæ all over the body. No enlargement of lymph-nodes, spleen, or liver was found. A blood-count showed Hb 115%, and red cells 5,950,000 per c.mm. The subsequent hæmatological history of mother and child is given in the accompanying table and figure.

Tests.—On Jan. 11, 1954, we found by the direct method anti-platelet agglutinins in the serum of both mother and baby. On Feb. 19, 1954, agglutinins were still present in the mother's serum but no longer in the baby's (Kissmeyer-Nielsen test). Both mother and baby belong to blood-group O-CcDe RIR, and in February, 1954, there was no evidence of anti-polymorph agglutinins or of iso-agglutinins. The

HÆMATOLOGICAL HISTORY OF MOTHER AND CHILD

Date	Mother				Child			
	Platelets (per c.mm.)	Bleeding-time (min.)	Purpura	Clot retraction	Platelets (per c.mm.)	Bleeding-time (min.)	Purpura	Clot retraction
May 28, 1953	46,800	6	+ + +	..	..	..	..	..
June 10, 1953	58,000	11	..	..	..	..	..	..
July 11, 1953	3500	30 +	+ + + +	Insufficient	..	..	..	..
Oct. 3, 1953	7000–10,000	..	..	..	..	..	..	..
Nov. 4, 1953	196,000	..	..	..	..	..	..	..
Dec. 3, 1953	280,000	..	..	..	10,000	22	+ + + +	Absent
Dec. 12, 1953	..	..	..	..	6000	..	..	..
Dec. 14, 1953	..	..	..	..	7000	1½	Nil	Light
Dec. 17, 1953	80,000	..	..	..	17,000	1¼	Nil	..
Jan. 11, 1954	144,000	..	Nil	..	100,000	..	Nil	Nil
Feb. 19, 1954	288,000	1¼	Nil	..	110,000	..	..	..
March 16, 1954	110,000	..	Nil	..	260,000	1½	..	..

Coombs test was negative in the serum of both mother and baby.*

Follow-up.—The purpura disappeared spontaneously and completely in the baby after six or seven days, and all further blood examinations were normal.

Discussion

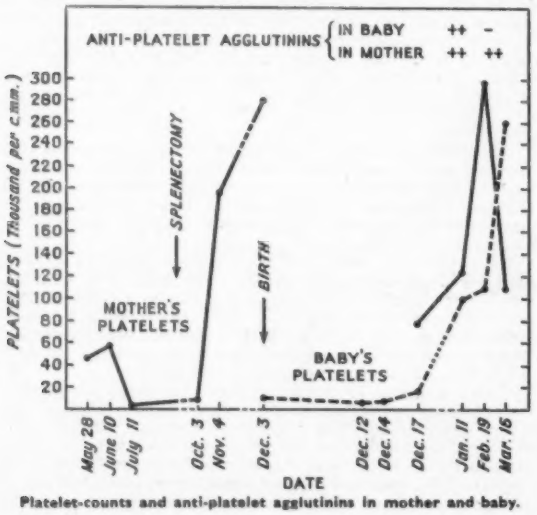
Since 1924 thrombocytopenia purpura in the newborn has been reported at intervals. In all the published cases the baby was born with purpura, which faded gradually in the first days of life. Landolt (1948) differentiated between three groups of congenital purpura, of which the first two disappear spontaneously: (1) the more important affects children born of mothers who have either Werlhof's disease (thrombocytopenic purpura) or secondary purpura; and (2) purpura affecting babies whose mothers had no hæmorrhagic disease.

Robson and Walker (1951) published an unusual case in which the mother was healthy at the time of the birth but started having hæmorrhagic manifestations three weeks after giving birth to a baby with generalised purpura; only then did the undiagnosed Werlhof's disease of the mother become obvious.

A third group of thrombocytopenia, often lasting a long time, is due to congenital hypoplasia of the megakaryocytes.

Our observation is of interest because of the presence of anti-platelet agglutinins in the serum of both the mother and her baby—a finding which has not previously been published. These agglutinins disappear spontaneously from the baby but persist in the mother. The anti-platelet agglutinins can continue to be formed and pass through the placental barrier even after splenectomy.

* We are indebted to Dr. J. J. Van Loghem and Dr. A. J. Sauer, Amsterdam, for their help in controlling the antibody reactions.



Platelet-counts and anti-platelet agglutinins in mother and baby.

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SODIUM-NITRITE POISONING TREATED BY EXCHANGE TRANSFUSION

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SODIUM nitrite is an exceedingly deadly poison, and all products containing it should be marked prominently as such, and at least an approximate formula should be given of their contents. Machine-oil containing sodium nitrite is increasingly used and is widely obtainable from engineering firms.

Case-record

A girl, aged 11, was admitted on May 28, 1954, fifty minutes after having taken one mouthful of an unknown machine-oil, some of which she spat out. A sample of this oil was brought along; but attempts to obtain the formula from the works where it was being used and the dealers from whom it was bought were unsuccessful.

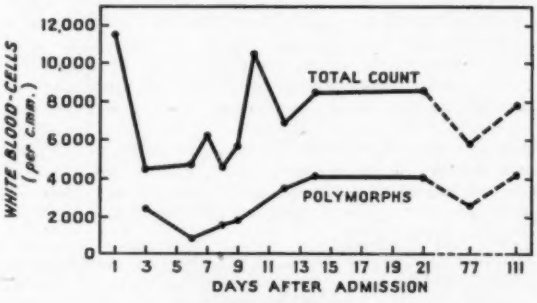
On admission the patient was unconscious, pale, and extremely cyanosed. Her pulse and respirations were feeble, and she did not respond to painful stimuli. When intravenous nikethamide 3 ml. was given, the venous blood was seen to be thick and chocolate-brown; methæmoglobinæmia was diagnosed. In view of this and of the patient's rapid deterioration a replacement blood-transfusion was started.

Treatment and Progress.—While the anæsthetist administered oxygen and did gastric lavage, an intravenous transfusion was started of group-O Rh-negative blood which was not cross-matched until later. The median cubital vein was opened for venesection, but rapid clotting made this very difficult. To hasten the withdrawal of blood the radial artery was partially divided at the wrist. Rapid clotting persisted until about 1250 ml. of blood had been transfused; it was so rapid that a nurse had to keep wiping away clots to maintain blood-flow from both vein and artery. When 1000 ml. of blood had been transfused and the patient's condition had begun to improve

thirty to forty minutes after admission, the West Midland Forensic Science Laboratory, to which a sample of the oil had been sent, reported that it contained 36·5% of sodium nitrite, 7·5% of an emulsifying agent, and 56·0% of water. Sodium nitrite 7–8 mg. per 100 ml. was present in the stomach washings. Spectroscopy showed methæmoglobinæmia. Altogether 1700 ml. of blood was transfused. The patient was nursed in an oxygen tent for forty-eight hours. Pyrexia and increased pulse-rate persisted for four days. Radiography of the chest showed no abnormality. The urine was normal. Procaine benzylpenicillin 300,000 units twice daily and ascorbic acid 300 mg. daily were started on admission and continued for twelve days.

Examination of the blood next day showed normal oxyhæmoglobin and Hb 15 g. per 100 ml. The following day the Hb was 17·4 g. per 100 ml. A white-cell count showed granulocytopenia (see figure), the polymorphs decreasing from 51% on May 31 to 19% on June 3, and was not normal until June 7—i.e., the tenth day. Türk's cells and "toxic" granules in the polymorphs were present on June 3 but not afterwards. On June 11 the blood picture, including absolute values, was within normal limits; and the patient was discharged fourteen days after the accident.

Follow-up.—On June 18 a white-cell count showed 8300 per c.mm. (metamyelocytes 1%, polymorphs 50·5%). Eleven weeks after admission the blood picture was normal, with



White-cell counts.

Hb 14·1 g. per 100 ml., white cells 6000 per c.mm. (polymorphs 44%). The child looked well and had been normally active after a fortnight's convalescence. Sixteen weeks after admission her blood picture remained normal, with Hb 14·7 g. per 100 ml. and white cells 8000 per c.mm. (polymorphs 54%).

Discussion

Sodium nitrite is absorbed rapidly, its effects starting five to twenty minutes after ingestion. Absorption starts sublingually, causing vasodilatation and, in large doses, syncope and methæmoglobinæmia. The methæmoglobin is the stable oxidised form of hæmoglobin with the iron in the trivalent ferric state. This form is only slowly broken down in the body and thus is of little value in supplying oxygen to the tissues. There is also a shift of the oxygen dissociation-curve to the left, making the oxygen less readily available to the tissues.

Ascorbic acid in doses of about 500 mg. daily is of value in the chronic mild cyanotic case, but severe cases of either chronic or acute methæmoglobinæmia require more rapid action. Intravenous methylene-blue 1–2 mg. per kg. of body-weight is reported to be effective in the methæmoglobinæmia following ingestion of nitrites in drinking-water by infants, but in acute poisoning with a moribund patient it is quicker and more satisfactory to start an exchange transfusion. The removal of the methæmoglobin together with any nitrite still circulating and the substitution of transfused blood will lessen the degree of bone-marrow damage with the resulting neutropenia. No time should be wasted in waiting for experts in exchange transfusion; the doctor who first sees the patient should give it.

Conclusion

In severe cases of sodium-nitrite poisoning an immediate exchange transfusion may be life-saving and is the method of choice.

Prolonged observation of the case is subsequently needed because of the danger of neutropenia and agranulocytosis despite a good general clinical condition, which is misleading.

I wish to thank Mr. J. S. Horn for permission to publish; Mr. Ruscoe Clarke for advice and encouragement; Dr. S. Sevitt for hæmatological reports; and Prof. J. M. Webster, of the West Midland Forensic Science Laboratory, for the speedy analysis of the mixture and for advice about after-treatment.

RUPTURE OF THE DUODENAL STUMP AFTER GASTRECTOMY

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POLYA gastrectomy is one of the commonest major operations. The risks associated with it have considerably diminished in the last fifteen years, but still a few of the patients die and one of the commonest causes of death is rupture of the duodenal stump. For this reason many methods of closing the stump have been devised.

In some cases in which leakage subsequently takes place the duodenum has been difficult to close (e.g., in patients with an adherent ulcer of the posterior duodenal wall); but in others, leakage follows a simple straightforward operation in which no difficulty whatever was experienced in closing the duodenal stump apparently securely. This state is almost invariably the sequel to operations for gastric ulcer or for malignant disease, when the duodenal stump occasionally ruptures. In such cases the rupture is often attributed to an inability of the patient's tissues to heal, and malnutrition is blamed; but in many of these cases no disorder of nutrition or imbalance of fluid or electrolytes can be found.

Aird (1949), Wangensteen (1941), and Tanner (1954) have emphasised that distension of the duodenal stump due to obstruction of the afferent jejunal loop may be the most important factor in rupture of the duodenal stump in such cases. Usually after leakage it is difficult at operation to be certain about pre-existing distension of the afferent loop. The following case is reported because there was clinical evidence of such a derangement, and it was clearly confirmed at operation, the afferent loop with the duodenal stump being distended virtually to the point of rupture of the stump.

Case-report

A married woman, aged 35, was admitted to Paddington General Hospital with a history of ten years' typical duodenal dyspepsia and one previous attack of melæna. She had already undergone medical treatment with temporary benefit, but her symptoms had now recurred.

On examination she was rather pale but otherwise looked fit, and no abnormality was detected on ordinary clinical examination. Further investigation, however, showed moderate anæmia and radiological evidence of a posterior-wall duodenal ulcer. After correction of her anæmia she was operated on.

Operation.—The abdomen was opened through an upper right paramedian incision and the presence of the ulcer confirmed. Without undue difficulty a high partial gastrectomy of the Polya-Hoffmeister-Finsterer type was done, but the abdomen was closed with stab drainage down to the site of the closed duodenal stump because this was not deemed perfect.

Radiograph showing distended afferent jejunal loop in left side of abdomen six days after Polya gastrectomy.

Progress.—Immediately postoperatively the patient's condition was satisfactory. Intermittent gastric suction through an indwelling Ryle's tube was used, and fluids were administered intravenously. Oral fluids were gradually instituted, but the Ryle's tube was left in situ for the purpose of an occasional aspiration to prevent overdistension of the gastric remnant. It was finally removed on the fourth postoperative day, when the last aspirated fluid contained bile and the afferent loop was therefore presumed to be patent. The patient's condition was excellent and remained so for a further two days, when she started to complain of colicky abdominal pain not associated with vomiting. She looked rather anxious, and her pulse-rate was raised. Examination of her abdomen revealed no generalised distension, but in the left upper quadrant a tender resonant localised swelling was just palpable. No relief of symptoms followed an enema, which produced a normal result with the passage of fæces and flatus, and the abdominal swelling was still palpable and unchanged. A straight radiograph of the abdomen (see figure) showed a gas-distended loop of bowel in which valvulæ conniventes could just be detected. In the absence of vomiting obstruction of the afferent loop was diagnosed.

Second Operation.—On laparotomy the duodenal stump was found to be intact but, together with the afferent loop, grossly distended. The obstruction appeared to be at the valve and due to occlusion of the jejunum from without by the closed portion of the cut end of the gastric remnant. The efferent loop was normal in calibre, the stoma between it and the gastric remnant being patent. An entero-anastomosis was effected between the afferent and efferent loops, and the abdomen was closed.

Subsequent Progress.—Parenteral fluids and gastric suction were reinstituted for a few days, after which the patient made an uneventful recovery and was in due course discharged. When last seen in the follow-up clinic she was feeling well and appeared normal on examination.

Discussion

It seems likely that, unrelieved, the obstruction would have proceeded to perforation of the duodenal stump, and that timely surgery obviated a serious catastrophe. If distension of the afferent loop is often a factor in causing leakage from the duodenal stump, it would be gratifying indeed if it could always be recognised at this stage.

Clearly diagnosis of obstruction of the afferent loop would be aided if it was associated with some definite syndrome. In the present case the picture presented was sufficiently definite to enable such a diagnosis to be made. The presence of an isolated distended coil of bowel clinically palpable in a patient exhibiting colicky abdominal pain, without vomiting, constipation, or generalised abdominal distension, strongly suggested the condition. Radiological examination lent considerable support to this clinical impression.

Retrospective examination of the notes of eight cases of duodenal leakage showed that, with the exception of one early rupture associated with inadequate closure, all the patients exhibited slight but definite signs suggesting some preliminary disorder before actual leakage began. The number of cases is small, but the findings conform with the commonly held view that even before rupture the postoperative progress of such patients is rarely smooth. The clinical features did not, apparently, form such a well-defined picture as in the present case, the most constant finding between operation and leakage being abdominal pain or discomfort associated with a raised pulse-rate. There was no record of radiography of the abdomen save in one case, where the generalised bowel distension was probably a manifestation of the ileus accompanying an already ruptured duodenal stump.

Conclusions

It seems likely that many cases of rupture of the duodenal stump after gastrectomy are preceded by prodromal symptoms and signs possibly related to obstruction of the afferent loop. The diagnosis of this condition would be greatly facilitated by the demonstration clinically or radiologically of the distended loop. The suggestion is therefore made that all cases after Polya gastrectomy where the cause of unsatisfactory progress is not evident not only should be submitted to careful abdominal palpation for localised distension but also should undergo routine and early radiological examination of the abdomen. In this way more cases of obstruction of the afferent loop may emerge, and the incidence of duodenal leakage be lowered by timely surgical intervention.

I wish to thank Prof. J. C. Gōligher for permission to publish, and the photographic department at St. Mary's Hospital, London, for the photograph.

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SUPPRESSION OF URINE IN ASPIRIN POISONING

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PATIENTS undergoing full salicylate therapy have often been reported to have albumin, red cells, and casts in their urine. Krasnoff and Bernstein (1947) and Biddle (1938) described glomeruli congested with red cells and tubular degeneration and necrosis in fatal poisoning, and Scott and Hanzlik (1916) and Hanzlik and Karsner (1917) described similar lesions in dogs and cats after large doses of salicylates. Gross and Greenberg (1948) considered that salicylates in amounts sufficient to produce poisoning might cause nephritis.

Only a few reports have been published which mention a diminished urinary output in salicylate poisoning, a development which should profoundly modify the treatment. Andrews (1938) described oliguria in one case and Charters (1944) in two others. Scott et al. (1917) recorded considerable diminution in urinary output after the administration of full therapeutic doses of salicylates; it reached its maximum about 10–20 hours after the symptoms of "toxicity" appeared, and returned to normal shortly before, or about the time that, the excretion of salicylate was completed.

A case of severe salicylate poisoning with almost complete suppression of urine is described here.

Case-report

A woman, aged 57, was admitted under the care of Dr. L. C. Martin on Oct. 4, 1954, in deep coma, with rapid deep respiration, flushed, and sweating profusely. Her temperature was 101·6°F, pulse-rate 120, blood-pressure 180/120 mm. Hg, urine acid, with sp. gr. 1·010, a trace of protein, and salicylates +++. It was established later that she had taken acetylsalicylic acid gr. 250–300 (50–60 aspirin tablets) the previous evening.

Treatment and Progress.—She was treated for salicylate poisoning by gastric lavage, large amounts of intravenous fluid (170 oz. of *N*/5 saline solution with 4% dextrose in the first 24 hours), 7 oz. of 5% sodium bicarbonate (discontinued when the urine became neutral), vitamin K 100 mg. 8-hourly intravenously, penicillin, and pharyngeal suction and oxygen as necessary. In spite of this the patient's condition deteriorated during the first 8 hours, with pulse-rate rising to 140, temperature 103·4°F, and blood-pressure falling to 120/80 mm. Hg. In the first 12 hours after admission the urinary output was 75 oz. Pulse-rate and respiration-rate had improved and the temperature was lower by the following morning. The patient was no longer in coma but became maniacal and required paraldehyde. In other respects her condition was less satisfactory. Her blood-pressure had fallen to 100/65 mm. Hg at 7 A.M. and to 80/60 mm. Hg at 8 A.M.; this was restored to 130/85 mm. Hg 4 hours later, after 20 oz. of plasma had been given. The patient had numerous fits during the morning and was given more paraldehyde. She did not recover consciousness again until 24 hours later.

Suppression of Urine.—In the second 12 hours the urinary output was only 3½ oz. in spite of copious intravenous fluids. The urine contained protein, red cells, and hyaline and granular casts. In view of the extreme oliguria intravenous fluids were discontinued 27 hours after admission. On the following days treatment for anuria was given as described by Bull et al. (1949) and was continued until adequate amounts of urine were passed; a high-carbohydrate low-protein diet was then substituted for it. The patient felt well and was fully conscious by the 4th day.

The urinary volumes were as follows:

1st day	midday to midnight	75 oz.	
2nd day	midnight to midday	3½ oz.	
,, ,,	midday to midnight	3 oz.	
3rd day	midnight to midday	3 oz.	
,, ,,	midday to midnight	6 oz.	
4th day	24 hr.	18 oz.	(urine + semi-solid stool)
5th day	,,	114 oz.	,, + ,, ,, ,,
6th day	,,	34 oz.	
7th day	,,	44 oz.	

The concentration of urea in the 24-hour specimens of urine gradually increased from 0·49 g. per 100 ml. on the 2nd day to 1·8 g. per 100 ml. by the 8th day. Red cells and casts disappeared from the urinary deposit by the 5th day, and the blood-urea level, which had reached a peak of 177 mg. per 100 ml. on the 5th day had fallen to 33 mg. by the 10th day. Salicylates had disappeared from the urine by the 7th day.

Discussion

It has been suggested that the oliguria associated with salicylate poisoning might be due to dehydration caused by excessive sweating (Scott and Hanzlik 1916), but this was not the cause in the present case, the urine being dilute, with sp. gr. 1·010 and the urea level low. It therefore seems that the suppression of urine was probably due to renal damage, which is known to occur in salicylate poisoning. It is very unlikely that this renal involvement was due to the extremely transient hypotension, which was neither sufficiently severe nor sufficiently prolonged to cause tubular necrosis. A direct nephrotoxic action of salicylates seems to be a more likely cause.

In a case such as this it is evident that the usual treatment of salicylate poisoning with copious intravenous fluids and alkalis might well prove fatal if continued after the development of severe oliguria. Pulmonary œdema has, in fact, been reported several times in fatal cases of salicylate poisoning, and may possibly have been due to overhydration.

Summary

A woman, aged 57, with salicylate poisoning developed extreme oliguria. She was given the usual treatment for acute renal failure and recovered.

I wish to thank Dr. L. C. Martin for his advice and permission to publish, and Dr. Paul Fourman for his help in the preparation of this paper.

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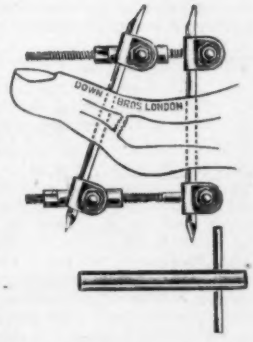
New Inventions

COMPRESSION CLAMP FOR ARTHRODESIS OF FIRST METATARSO-PHALANGEAL JOINT

ARTHRODESIS of the first metatarso-phalangeal joint has been advocated for selected cases of hallux rigidus and hallux valgus. In order to shorten the time of immobilisation and to ensure more certain arthrodesis, an attempt has been made to apply the principle of compression arthrodesis to this joint.

The problems involved are the fixing of the joint in flexion and slight adduction, the transfixion of the bones on each side of the joint with Steinmann's pins without splitting the bone, the avoidance of a scar in this weight-bearing area, and the avoidance of injury to the tendons.



Messrs. Down Brothers have made for me a compression clamp which, I think, fulfils these requirements. It consists of two short Steinmann's pins which are fixed into two screw-clamps which have been modified from the East Grinstead fixation apparatus for the treatment of fractures of the jaws (see figure). The universal clamps of this apparatus enable the pins to be inserted at an angle instead of parallel.

The first metatarso-phalangeal joint is denuded of cartilage and the bone surfaces are cut to give the required flexion and adduction and exact apposition of the cancellous bone. Before inserting the Steinmann's pins, the bones are drilled with a ⅛-in. drill in order to avoid splitting the bones. The proximal pin is then passed downwards and slightly backwards, in order that the pin may come out through the skin behind the pressure-point of the ball of the great toe. The distal pin is passed vertically downwards—that is, obliquely through the flexed phalanx. The clamps are then applied and screwed tight.

It has been found that after three weeks there is firm clinical union, and the patient is allowed up walking after four weeks.

This instrument can be obtained from Messrs Down Bros. and Mayer & Phelps Ltd., 32, New Cavendish Street, W.1.

K. F. HULBERT
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West Hill Hospital,
Dartford, Kent

Reviews of Books

Medical History of the Second World War

The Royal Air Force Medical Services. Vol. 1: Administration. Editor: Squadron-Leader S. C. REXFORD-WELCH, M.A., M.B.C.S. H.M. Stationery Office. 1954. Pp. 611. 70*s*.

THE exact date of the birth of the Medical Branch of the R.A.F. seems uncertain, but its growth can hardly be said to have begun until after the end of the first world war, and it faced its first big test in 1939 unencumbered by too much experience. To this absence of rigidity can be ascribed the successful development of activities which had not been foreseen. Rehabilitation units and special departments for treating burns and facial injuries are examples of clinical work, fostered by a sympathetic administration to meet an immediate war-time need, which later diffused through the whole of medical practice. Planning for the unknown is disappointing work, only made tolerable if a good deal of variation is allowed for. It is in a way symbolic that of the general hospitals constructed by the R.A.F. early in the war, the hutted buildings were found to be more easily altered to meet changing needs.

Among the specified aims of this history is the definition of mistakes in the light of after-knowledge, and Squadron-Leader Rexford-Welch has recorded faithfully both success and failure. His difficulty in selecting material must have been great, and the interest of the sections have a varying appeal. The struggles and difficulties of organising the air transport service for the sick and injured are well described; and the description should be widely read, for there was much criticism at the time. The story of the final achievement during the invasion of France is dramatically exciting. Another chapter of general importance is that on medical man-power. The fighting Services are usually held to be greedy in their demands for doctors: here are set down the arguments and increases for all to see.

Much of the volume, though of domestic interest to those who served in the R.A.F., carries no wider lessons. Something shorter than three volumes at 70*s*. each would probably be more welcome to outsiders.

The Casualty Department

T. G. LOWDEN, M.A., B.M., F.R.C.S., consultant surgeon, Sunderland Royal Infirmary. Edinburgh and London: E. & S. Livingstone. 1955. Pp. 278. 37*s*. 6*d*.

THE casualty department is the shop window of a busy general hospital, yet it is sometimes neglected by the senior members of the staff. Mr. Lowden sets the work of the casualty department in proper perspective. His book will be of value to everyone, from house-officer to consultant, who has anything to do with surgery; and it should be read by the medical student in his final year. He combines good sense with clear exposition and excellent illustrations, and he deals with conditions that are common and of economic importance.

Mr. Lowden sees the problem of casualty work in the setting of our times. He does not merely repeat descriptions of septic conditions and injury, and their treatment; he guides the reader in the management of the case and the situation. The patient's financial and temperamental background occupies one chapter, sound advice on legal responsibilities another, and legal protection the next; in another the implications of industrial injury and disablement benefit are considered. His appendices show the value of simple investigations conducted despite the hurly-burly of such a department. This is a valuable book.

The Graphomotor Projection Technique

Clinical Use and Standardisation. SAMUEL B. KUTASH, PH.D., chief, clinical psychology section, Veterans Administration Hospital, East Organge, New Jersey; RAYMOND H. GEHL, M.D., psychiatric consultant, Newark regional office, mental hygiene clinic, Veterans Administration. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1954. Pp. 133. 27*s*. 6*d*.

FOR assessing personality, drawings have the advantage that they provide permanent records of self-expression. The difficulty is to know what they represent, and to compare them one with another. Some people think they have only to look at a drawing to interpret it correctly; but the authors of this book hold that skill in classifying records can be developed only through practice and experience under the supervision of an "indoctrinated and trained" examiner.

The subject has no model to follow. He is blindfolded during the entire graphomotor performance, and the "fundamental rule" is to ask him to move his pencil freely over the paper provided, and "to try not to make anything definite." The aim is to elicit free expression from inner promptings, and to note the character of such movements. Each subject is later asked what he was thinking about while he was drawing, and, finally, whether he is able to recognise parts of what he drew. The authors claim that this association part of their test is unique, being "loaded" by the subject himself, in the sense that he creates the material out of which content is first delineated, and then used as the stimulus for association.

Normative data consist of "200 well-substantiated schizophrenic patients" and a control group of "200 apparently normal persons." Since only these two groups are compared, the test's practical value cannot be assessed, however much we may admire its theoretical principles.

Analgésie obstétricale

B. JAMAIN, gynécologue-accoucheur de l'Hôpital Tenon; R. GIRAUD, assistant en obstétrique des Hôpitaux de Paris. Paris: Masson. 1954. Pp. 156. Fr. 900.

THIS is a fairly comprehensive work on the clinical aspects of obstetrical analgesia. Pain in labour, its mechanism, and the practical implications of analgesia in terms of fœtal physiology are discussed; but the greater part of the text consists of descriptions of the drugs and techniques for relieving pain.

Perfect analgesia in childbirth is still an elusive ideal; and Dr. Jamain and Dr. Giraud rightly emphasise the need for clinicians to keep an open mind and select the method suited to the particular patient and obstetrical problem. Their own views are similar to those widely held in this country, and they show a preference for general rather than local methods of analgesia.

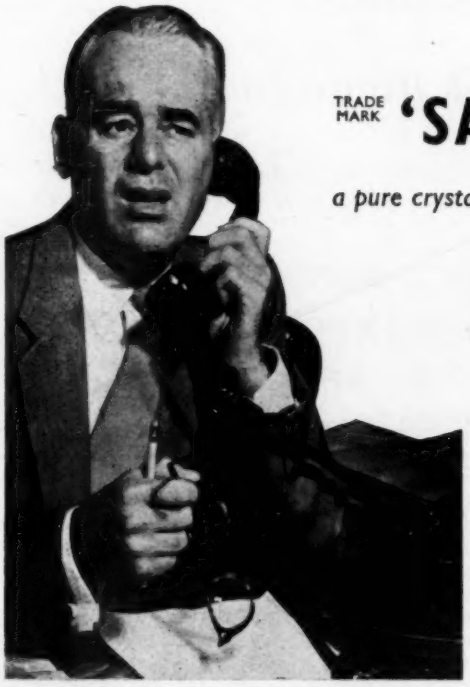
Hospital Planning Requirements

GUY ALDIS, A.R.I.B.A. London: Pitman. 1954. Pp. 257. 85*s*.

Mr. Aldis is the architect to the East Anglian Regional Hospital Board, and his book is primarily for architects; but it will also be useful to the many doctors who are likely to be concerned with hospital reconstruction in the coming years.

He does not attempt to impose a standard design for future hospitals, but he sets out the basic needs for individual departments, and indicates the importance of correct lines of traffic and the needs of patients as well as of medical and nursing staff. In short detailed notes supplemented by over 400 diagrams he covers the clinical service of a hospital—the casualty department, outpatient department, different ward units, operating-theatre, X-ray department, pathology department, and mortuary block. In a later book he hopes to deal with the administrative and service departments.

Diseases of the Skin (4th ed. Philadelphia and London: W. B. Saunders. 1954. Pp. 877. 65*s*.).—Dr. G. C. Andrews has brought the new edition of his popular textbook right up to the minute and has at the same time reduced the total number of pages by 60—good evidence that out-of-date matter has been ruthlessly cut. Though this is a book for specialists, it is not unsuited to the practitioners and students, being lucidly written and telling the reader in fair detail what to do by way of treatment. Possibly the dangers of treating tuberculosis of the skin with vitamin D are over-emphasised. The chapter on syphilis has rightly been retained; but Dr. Andrews seems to pin all his faith on penicillin, and states that "supplementary treatment with arsenic and bismuth does not increase the good results and is of no value." This does not conform with current British ideas or practice. Nevertheless, this is a good book, well presented, with plenty of good illustrations and adequate references.



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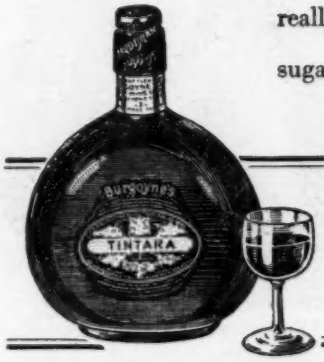

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THE LANCET

LONDON: SATURDAY, MARCH 19, 1955

Tuberculous Lesions after Chemotherapy

THE changes in tuberculous lesions after treatment with streptomycin [1] may be summarised as follows: there is absorption of non-specific exudate (e.g., in tuberculous bronchopneumonia, meningitis, and the perifocal reaction [2]); diffuse fibrosis, perhaps going on to hyalinisation, takes place in miliary foci and in small follicles round larger lesions, while larger lesions and necrotic foci undergo fibrous encapsulation; and walls of cavities become densely fibrous, sometimes with a smooth surface and formation of a lining epithelium. These changes are found especially in more recent lesions, whereas old densely fibrosed foci are unaffected. All these changes have been found also in untreated patients (though perhaps only in occasional lesions and hardly ever in all lesions at once): absorption of non-specific exudate,[3] fibrosis of miliary lesions,[4] and healing of cavity walls [5] have all been noted in the natural course of the disease. Thus the effect of streptomycin is antibacterial and not on the tissues; the drug enables regression to take place in all lesions at once, with contracting fibrosis of the actual lesion (especially if recent) and clearing of the tissues around. In chronic cavities with extensive fibrosis around them, no great improvement can be expected from this treatment: active parts may become quiescent, but after chemotherapy has been stopped any part may become active again; even after a course of streptomycin tubercle bacilli can be isolated from the caseous contents and walls of such chronic cavities. Thus streptomycin gives rise to no specific changes. This assessment is confirmed by the five-year report [6] of the first Medical Research Council trial of streptomycin in pulmonary tuberculosis. At the end of five years 2 out of 52 controls, compared with 9 out of 55 streptomycin-treated patients, had required no further treatment, and there were more arrested and quiescent cases in the streptomycin than in the control series; yet after the initial streptomycin therapy both series had required about the same amount of further therapy and surgical (including collapse) treatment. Combination of streptomycin with *p*-aminosalicylic acid (P.A.S.) produces the same fibrosis in recent lesions with clearing of non-specific exudate. AUERBACH [7] claims that treated lesions can be distinguished from untreated lesions by reason of the more rapid clearing of the perifocal reaction; but DICK [8] found that in chronic renal lesions after three months' treatment it was impossible to decide how much of the fibrosis was the result of treatment and how much was due to natural regression before treatment had been started.

MACKANESS [9] and SUTER [10] have shown that isoniazid has a more powerful bactericidal action than streptomycin, and that it kills intracellular as well as extracellular bacilli. Corresponding histological changes have been reported. In lung lesions PANÁ et al.[11] noted congestion and increased vascularity in cavity walls with hæmorrhages into caseated material and around nodules not yet ulcerated, and also thinning and desquamation of the necrotic material. BERBLINGER [12] found some healing in caseous and productive foci, with congestion and hæmorrhages, and his illustrations show desquamation of tuberculous granulation tissue and disappearance of epithelioid cells, and also absorption of non-specific exudate. KÖNN [13] reported that cavities to which isoniazid was applied locally by Monaldi drainage became lined with non-specific granulation tissue covered by stratified epithelium. Similar changes were found in tuberculous kidneys,[14] but the dense fibrosis which develops in and around lesions after streptomycin did not follow administration of isoniazid. These changes followed treatment with isoniazid alone and were found in what would now be regarded as the early stages of treatment (the first three months). DE FIGUEIREDO and DE PAOLA [15] suggest that the changes characteristically resulting from treatment with isoniazid are hyperæmia (commonly with small hæmorrhages) round all types of tuberculous lesions; epithelial proliferation in bronchioles and lining alveoli; complete healing of cavity walls, sometimes with small stretches of lining cells; many pleomorphic giant-cells; patches of foam-cells; and exuberant collagenous formation. DENST [16] had already drawn attention to the numerous atypical giant-cells, the patches of foam-cells, and the surprising amount of non-necrotic fibroblastic granulation tissue; and he also remarked on the liquefaction of cavity contents with polymorphs and red blood-cells, though noting that this softening could take place spontaneously in untreated tuberculosis. CANETTI [17] described the disappearance of a large number of miliary tubercles, resorption of perifocal inflammation, and fibrous or fibrohyaline transformation of persisting lesions; and he and others [18 19] have described the possible improvements in cavity walls. DICK [14] ascribed these changes in recent lesions to resolution brought about by isoniazid in a way which there is no opportunity of observing in man, but which has been described for miliary lesions in the liver, spleen, and bone-marrow of rabbits.[20] There

1. Baggenstoss, A. H., Feldman, W. H., Hinshaw, H. C. *Amer. Rev. Tuberc.* 1947, **55**, 54; *Proc. Mayo Clin.* 1947, **22**, 265. Wright, G. Payling, *In* Madigan, D. G., Swift, P. N., Brownlee, G., Wright, G. P., *Lancet*, 1947, ii, 897. Montgomery, G. L. *Glasg. med. J.* 1948, **29**, 235. Flory, C. M., Correll, J. W., Kidd, J. G., Stevenson, L. D., Alvord, E. C., McDermott, W., Muschenheim, C. *Amer. Rev. Tuberc.* 1948, **58**, 421. Silverthorne, M. C., Silverman, G. *Ibid*, 1950, **61**, 525. Mahon, H. W. *Ibid*, p. 543.
2. Auerbach, O., Stemmermann, G. N. *Amer. Rev. Tuberc.* 1948, **58**, 449.
3. Florey, H. Lectures on General Pathology. London, 1954; p. 649.
4. Rich, A. R. The Pathogenesis of Tuberculosis. Oxford, 1951; p. 830.
5. Pagel, W., Simmonds, F. A. H., Macdonald, N. Pulmonary Tuberculosis. London, 1953; p. 35.
6. Fox, W., Sutherland, I., Daniels, M. *Quart. J. Med.* 1954, **23**, 347.
7. Auerbach, O. *Amer. Rev. Tuberc.* 1955, **71**, 165.
8. Dick, J. C. *Lancet*, 1954, ii, 516.
9. Mackaness, G. B., Smith, N. *Amer. Rev. Tuberc.* 1953, **67**, 322.
10. Suter, E. *Ibid*, 1952, **65**, 775.
11. Paná, C., Belli, N., Perelli, A. *Lotta c. Tuberc.* 1952, **22**, 303.
12. Berblinger, W. *Acta davos.* 1952, **11**, 1.
13. Könn, G. *Beitr. path. Anat.* 1953, **113**, 292.
14. Dick, J. C. *Lancet*, 1953, i, 808.
15. De Figueiredo, F. P., De Paola, D. *Amer. Rev. Tuberc.* 1955, **71**, 186.
16. Denst, J. *Ibid*, 1953, **68**, 144.
17. Canetti, G. *Bull. Un. int. Tuberc.* 1954, **24**, 144.
18. Bronet, G., Hertzog, P., Chrétien, J. *Rev. Tuberc., Paris*, 1954, **18**, 337.
19. Bernard, É., Renault, P., Chrétien, J., Dubois, E., Selvaradja, *Ibid*, p. 508.
20. Rich, A. R. The Pathogenesis of Tuberculosis. Oxford, 1951; pp. 320, 323.

is much radiographic and clinical evidence to support the finding that recent lesions clear up completely after isoniazid therapy. We have accordingly good grounds for hoping to find that in the five-year reports of the M.R.C. trials of isoniazid a substantial proportion of patients have required no further treatment after combinations including isoniazid.

In chronic cavities and other chronic lesions, the resolution is modified by dense fibrosis and caseation.[8] After changes in recent lesions have proceeded as far as the natural fibrosis allows there is nothing to distinguish treated from untreated lesions which have become quiescent naturally. But bacteriological studies show that tubercle bacilli can be cultured from a large proportion of lesions in surgical specimens after chemotherapy. Even if such specimens are negative to ordinary methods of culture, special methods [21] still demonstrate that many are positive. Hence in these late cases chemotherapy alone does not suffice. Despite the great advance in the treatment of tuberculosis by the introduction of these drugs, we must still concentrate on finding cases as early as possible and on initiating treatment without delay.

A Shared Responsibility

THE old, it is often said, are like children; and the temptation to treat them like children—to relieve them of all responsibility, manage their affairs, smile at their protests, and chide them for resenting our authority—is strong. But they are not children: they have a lifetime of experience and responsibility behind them which they do not forget; and many of them feel that when plans are made on their behalf they ought at least to be consulted. Miss A. M. SHERIDAN [22] has lately pointed out some of the hardships which high-handed methods may cause. A sudden decision to discharge an old person from hospital, so as to free his bed for another, may come as a serious psychological shock to him—a shock which may or may not be mitigated when he learns that plans for his future (based on his doctors' prognosis) have already been made. If he protests at being sent to a residential home or hostel he is called "difficult," a label which patients of any age do well to avoid. Yet his fault may be no more than resistance to what the hospital staff consider best for him; and, as Miss SHERIDAN says, "what they consider best coincides, in a surprisingly large number of cases, with the quickest and easiest way of clearing the bed." Admission to a residential hostel may mean, for him, consenting to give up the home in which he has lived for forty or fifty years and going to a new home among strangers—not a decision (she points out) which anyone would like to take at short notice and without due inquiry. Again, he may never have been asked for some simple information which would have influenced those shaping his destiny. She mentions the case of a woman transferred from a hospital in the north of England (whither she had been evacuated in 1939) to a region where she was believed to have relatives. Not until she was on the train was she told where she was going and why: whereupon she explained that she had no relatives whatever in that part of the country.

Discharge without due warning may mean hardship not only to patients but also to their families. They may have nursed a mentally disturbed or incontinent patient devotedly for many months before a bed could be found for him, and may have suffered great physical fatigue, as well as feelings of fear, disgust, or inadequacy. If they are not prepared in advance for for his discharge, fortified by regular accounts of his progress, given time to prepare for him, and helped to solve the problems his return will create, they are apt to panic and say that they cannot have him home. They, too, are then called "difficult"; and are cited as examples of the way the Welfare State undermines our sense of responsibility for elderly relatives. But a sense of responsibility, as Miss SHERIDAN remarks, is a thing of slow growth, planted by early training and developed by experience: in the middle-aged children of our elderly patients it came to maturity long before the Welfare State was born. Those who seek to evade reasonable responsibility, she says, are the same people as would have done so before the days of the National Health Service. Most relatives, provided they are properly prepared for it, are coöperative about having elderly patients back again.

In these matters, the task of the almoner is to give help alike to patients, relatives, and hospital staff. She must resist any temptation to take the responsibility off the family by "organising" something: instead she must give them the sort of help which enables them to solve their problems for themselves. To do this she must see the patient and his family early in his treatment ("long before he has become a 'social problem' in the eyes of the medical and nursing staff"); and with experience she soon comes to know the combination of prognostic and domestic circumstances which are likely to produce trouble later. She can thus anticipate and mitigate the difficulties which may come from unexpected and sudden notice of discharge, arrange assistance well in advance for those who will need it, and recognise early the cases in which discharge home will prove impossible. She may then have to tell the doctors that a patient they wish to discharge still requires more nursing and care than can be arranged for in the average household, and she may have to explain, not once but many times—especially to junior medical staff, who come and go—that domiciliary services and residential homes and hostels all have their limits. She may have to tell doctors—and sometimes, Miss SHERIDAN finds, she tells them in vain—that no satisfactory arrangements can be made for a patient they propose to send out.

It is part of the almoner's accepted duty to do these things: yet surely it should not be hers alone. Surely the doctor who discharges a patient should have a full and clear idea of what is to become of the person on whom he has spent much time and skill, and should himself be satisfied with the proposed arrangement? His concern for those on the waiting-list is bound to exceed his concern for those for whom he has already done his best; but it should not outweigh it entirely. He should share with patient, almoner, and relatives the duty of seeing that the good work of the hospital is not wasted.

21. Hobby, G. L., Auerbach, O., Lenert, T. F., Small, M. J., Comer, J. V. *Amer. Rev. Tuberc.* 1954, **70**, 191.
22. *Almoner*, 1955, **7**, 411.

Man in Space

SPACE flight is already with us. Space travel (not to be confused with interplanetary travel) will come before long [1]; but the needs and reactions of man in space must be determined before the aeronautical engineer can begin his drawings. Unmanned balloons have reached an altitude of 40 miles, and rockets of about 250 miles; but so far the highest that man has reached is 72,395 feet (about 14 miles) in a balloon ascent by STEVENS and ANDERSON in 1935.

For space travel a completely self-contained sealed cabin is essential. This will have to pass rapidly through the air, where, although the temperature falls with increase of altitude, friction and compression cause great heat; then through a region of high temperature containing toxic amounts of ozone; then through a region of great cold; and finally into space, where solar and other radiations maintain the temperature at about 4000°F. Accordingly the crew will have to be protected against both overheating and overcooling; and for this purpose it may prove possible to devise a system of reflectors and absorbers to maintain the temperature within the comfort range of 50–75°F. The other main problems are removal of carbon dioxide and other excreta, the supply of oxygen, pressure, radiation, weightlessness and acceleration and deceleration. A carbon-dioxide concentration of 6–7% becomes distinctly uncomfortable after a time, especially at low oxygen tension; and more than this is dangerous. Carbon dioxide and water-vapour could be removed from the cabin by chemical absorbers, but these are bulky and their margin of safety is small. It may be possible to arrange that, after absorption, the gas is released and passed through air-locks into space, thus freeing the chemical for repeated use. Similar methods will have to be developed for other excreta, such as methane, amines, volatile oils, and the products of bacterial fermentation of fæces and urine. Normally these substances never reach a toxic concentration, but in a confined cabin some might do so; in addition, many are disagreeably odorous. The oxygen-supply can probably best be carried as a liquid in fibre-glass or other containers from which it must be delivered with the least possible waste. In high-altitude flying (which is quite different from space travel) compressors can be used to force the outer air into the cabin at the necessary pressure; but in space, where there is no outer air, the pressure-developing mechanism must be incorporated in the outfit for supplying oxygen. Probably crews will have to be acclimatised to high altitude, in order to keep the internal cabin pressure as low as possible and so reduce the strain on the hull, whose outer side will be in a virtual vacuum. When breathing air man can live and work at 16,000–18,000 feet; breathing pure oxygen he can operate at an equivalent of 45,000 feet (a pressure of 110·9 mm. Hg), but in practice the equivalent of a somewhat lower altitude would be safer. Fortunately, pure oxygen appears to be non-toxic at altitudes above 15,000 feet. Ultraviolet light would probably not be a hazard inside the cabin, but some of the heavy primaries of cosmic radiation might pierce the hull and cause delayed effects. No doubt, non-penetrable materials will be found for the hull. In space man and materials would have mass but no weight, owing to the absence of gravity forces. The resulting loss of elastic deformations would probably not impair most physiological functions. The main difficulty would be the altered stimuli from the vestibular and anti-gravity systems. Normally there is a base-line of stress from which we judge position at rest and in movement; and without this base-line an entirely new coördination would have to be learnt unless the cabin were supplied with a rotational device to simulate gravity. Further, where there is no gravity there is no convection; so a highly efficient air-stirring system must be provided, to prevent the crew suffocating in its own expired air. At present rocket craft move in space in a bizarre and far from smooth manner that would cause prostrating motion-sickness: this is a problem for the engineers. Visual adaptation will be necessary. In gasless space there is no light scatter; light is brilliant, shadow totally dark, and the visibility range almost limitless. So much for space itself, but it has to be reached and left. This means that the crew must undergo enormous acceleration and deceleration. During the development of high-speed aircraft much has been learnt of how to lessen the harmful effects of such changes, but more needs to be known.

If man with the help of machines can adapt himself to space it will be as great a step as from water to dry land. We may surely imagine that the step will be taken. After all, did any silurian JULES VERNE dream that even his remotest cousin would one day breathe air? Yet that is what we do.

1. Those interested may consult: (*a*) Physics and Medicine of the Upper Atmosphere. Edited by C. S. WHYTE and O. O. BENSON. Albuquerque: University of New Mexico Press. 1952. (*b*) Man's Milieu in Space. By R. M. FENNO. *J. Aviat. Med.* 1954, **25**, 612. (*c*) Aviation Medicine in its Preventive Aspects. By J. F. FULTON. London: 1948.

Annotations

RESUSCITATION OF THE NEWBORN

TWO years ago Donald and Lord [1] stated: "Every year in England and Wales about 14,000 children die in the first month of life, and of these about 2300 are certified as dying of asphyxia and atelectasis." In an attempt to break what they called "the vicious circle of anoxia, œdema, and atelectasis" in newborn infants in respiratory distress Donald and Lord introduced a "servo patient-cycled respirator," which aids inspiratory efforts in phase with natural respiratory movements, without the imposition of regular periodic pressure changes which are often opposed to the patient's own spontaneous efforts.

Parallel with efforts along these lines to improve the oxygen supply and keep the airways open, several workers in the United States had turned their attention to the possible use of detergents to expand collapsed lungs, on the ground that such agents would encourage formation of air-liquid interfaces at points where the respiratory surfaces were apposed, thereby improving aeration of the whole lung. Gruenwald [2] in 1947 claimed that a surface-active substance, amyl acetate, reduced the pressure necessary for expansion of infants' lungs post mortem, and he suggested that the addition of such a substance to the inspired gas might relieve the initial atelectasis of the newborn. In 1952 this began to seem feasible after the introduction into clinical work of a non-ionic detergent of remarkably low toxicity ('Triton A-20,' latterly called 'Triton WR-1339'), which had been used in the strepto-

1. Donald, I., Lord, J. *Lancet*, 1953, **i**, 9.
2. Gruenwald, P. *Amer. J. Obstet. Gynec.* 1947, **53**, 996.

mycin-aerosol treatment of pulmonary tuberculosis,[3] and to ease the expectoration of viscid mucus. From experiments on himself and on rats, Miller concluded that this detergent (an alkylaryl poly-ether alcohol) could safely be administered in effective concentration by aerosol. Ravenel [4] reported the successful treatment of 18 infants with massive atelectasis or aspirated fluid, whom he exposed to a nebulised mist of 'Alevaire' (5% glycerine, 2% sodium bicarbonate, and 0·5% triton WR-1339 in distilled water). In his view the use of alevaire would save a substantial proportion of patients with neonatal atelectasis. Bloxsom [5] has made a further study with alevaire, using it both as a primary agent and to hold the spreading factor, hyaluronidase, in aerosol suspension. He claims that in neonatal atelectasis lung expansion proceeds more rapidly when spreading factor and detergent are combined. The argument for incorporating hyaluronidase seems somewhat tenuous; but in the five cases reported by Bloxsom this combination was apparently successful where oxygen therapy alone was not.

The efficacy of detergent treatment of atelectasis cannot yet be evaluated; but the early results are promising, and this type of adjuvant therapy certainly deserves attention.

POST-TRAUMATIC PAINFUL STATES

INJURY is normally followed by an orderly progression of repair together with disappearance of pain, œdema, and any associated vasomotor changes. This sequence is complex and ill understood, but it is usually so rapid and certain that we are surprised and even indignant when the pattern is changed. That major and minor trauma may be followed by persistent pain, vasomotor disturbances, osteoporosis, soft-tissue atrophy, and gross loss of function, has long been recognised. Mitchell [6] gave an excellent clinical description of causalgia from the many cases of peripheral-nerve injury which he studied in the American Civil War, and thirty years later his son found that in some the pain had continued unabated. The intense burning pain, which most commonly follows damage to the median and sciatic nerves, is characteristically enhanced by any circumstances which initiate sympathetic activity; and Doupe et al.[7] suggested that the injury causes a failure of fibre insulation, allowing the vasoconstrictor impulses to short-circuit to the afferent pain-fibres. Causalgia is greatly relieved by sympathectomy.

There are many painful states which follow minor nerve and soft-tissue trauma that are less well defined. Various descriptive titles have been applied to these, often according to the dominant symptom or to the observer's impression of their pathogenesis; minor causalgia, reflex dystrophy, post-traumatic dystrophy, and traumatic neuralgia are some of the many. The degree of trauma is unrelated to the severity of the symptoms, and rarely the trauma may be trivial without breach of the skin surface. Most commonly perhaps, the post-traumatic painful state follows division of a small peripheral nerve. The pain may be spontaneous or be aroused only by cooling or touch. It may be burning or aching; and on this major pain may be superimposed unpleasant bizarre sensations, such as tingling or a feeling of electric shock. The threshold for pain both in the skin and the deep tissues is much lowered, and the patient alertly guards the extremity from any mechanical contact. Œdema and vasodilation occasionally develop in the early stages; but the skin is usually cold, cyanosed, thinned, and covered with perspiration. The connective tissue, joint capsule, and bone show varying degrees of atrophy.

Casten and Betcher [8] have reviewed their therapeutic experience with this chronic disorder, which they term reflex sympathetic dystrophy. The patient is told about the nature of the disorder and reassured about the eventual outcome, and his coöperation is obtained. Function is improved by physiotherapy, and the sympathetic pathway to the limb is interrupted by procaine ganglionic blocks or by ganglionectomy. Ganglionic block, they suggest, is best achieved by continuous paravertebral infiltration of local anæsthetic for up to three weeks. Of 147 cases 82 showed an excellent response, 56 were improved, and only 9 did not respond. The value of interrupting the sympathetic pathway in post-traumatic painful states has been described previously (many believe that it benefits the patient by improving the peripheral circulation rather than by relieving pain). Paravertebral infiltration of local anæsthetic is such a simple measure that it should always be tried in these distressing cases.

MYOPATHY AND MYOSITIS

MYOPATHY, or muscular dystrophy, is usually regarded as a progressive degenerative disorder of voluntary-muscle fibres in which regeneration does not occur. Improvement, but not recovery, has been claimed after the administration of glycine, of vitamin B_6, and of wheat-germ extracts; but controlled studies[9,10] have not supported these claims. The rate of deterioration varies greatly; in the disease starting in childhood, in which pseudo-hypertrophy of muscle is common, there is usually a relentless downhill course, and commonly the child is bedridden after three or four years. When the disease starts in late adolescence or in early adult life, either as the facio-scapulo-humoral type of Landouzy and Déjerine or as the shoulder and pelvic-girdle type described by Erb, deterioration may be extremely slow, and in some patients there are long periods in which the disease appears to be stationary. Professor Nattrass [11] has reported 8 cases in which there was complete or virtually complete recovery. Nattrass examined only 1 of these patients during the severe phase of the disease; but clinical records of this stage, when muscular dystrophy had been diagnosed, were available in all 8, and Nattrass examined each of them after their recovery. Of the older reports of apparent recovery, the best authenticated is that by Erb [12] of a boy who at the age of five developed weakness of the pelvic and shoulder girdles and was found by Erb to have the typical clinical characteristics of a myopathy except that the tendon-reflexes were retained. By the age of ten this boy had improved considerably, and by the age of sixteen he was well and strong.

The cases described by Nattrass appear to fall into two groups: 1 or possibly 2 cases were probably examples of the myopathic type of amyotonia congenita—a condition differing in prognosis from classical myopathy. The majority of patients who in infancy show the clinical picture of amyotonia congenita have the infantile progressive spinal muscular atrophy described by Werdnig and Hoffmann,[13] but Batten [14] suggested that amyotonia congenita could also be produced by a benign infantile myopathy, and this supposition was later confirmed by a long-term follow-up of an affected family and necropsy of one of the family who died of bacterial endocarditis.[15,16] The other 6 cases were of a different type. These were in 4 boys and 2 girls who developed symptoms of muscular weakness between the ages of three and

3. Miller, J. B., Boyer, E. H. *J. Pediat.* 1952, **40**, 767.
4. Ravenel, S. F. *J. Amer. med. Ass.* 1953, **151**, 707.
5. Bloxsom, A. *Anesthesiology*, 1955, **16**, 41.
6. Mitchell, S. W. *Amer. J. med. Sci.* 1878, **76**, 17.
7. Doupe, J., Cullen, C. R., Chance, G. Q. *J. Neurol. Psychiat.* 1944, **7**, 33.
8. Casten, D. F., Betcher, A. M. *Surg. Gynec. Obstet.* 1955, **100**, 97.
9. Fitzgerald, G., McArdle, B. *Brain* 1941, **64**, 19.
10. Walton, J. W., Nattrass, F. J. *Ibid*, 1954, **77**, 169.
11. Nattrass, F. J. *Ibid*, p. 549.
12. Erb, W. *Münch. med. Wschr.* 1908, **55**, 2121.
13. Brandt, S. Werdnig-Hoffmann's Infantile Progressive Muscular Atrophy. Copenhagen, 1950.
14. Batten, F. E. *Quart. J. Med.* 1909, **3**, 313.
15. Turner, J. W. Aldren. *Brain*, 1940, **63**, 163.
16. Turner, J. W. Aldren. *Ibid*, 1949, **72**, 25.

eight; in all of them the weakness appears to have affected predominantly the proximal limb muscles, in most pseudo-hypertrophy of some muscles was present, and in all the weakness seems to have become rapidly worse. In each of these 6 muscular dystrophy was diagnosed, but they all recovered from their muscle weakness after two to seven years. One case is of especial interest, since a male cousin had died at the age of fifteen with supposed progressive muscular dystrophy; but unfortunately clinical records of this cousin's illness were not obtainable. In the other 5 there was no known family history of neurological disease. There was a curious feature in the patient with the positive family history, in that he had two separate attacks of muscular weakness and in the second attack severe muscle wasting; he recovered completely from each of the attacks. As regards treatment 1 patient received nicotinic acid and 1 injections of chorionic gonadotrophin, but in neither did improvement seem to be related to the administration of these substances; 3 other patients were given wheat germ, and in all 3 improvement started shortly after the start of this treatment.

In retrospect Nattrass doubts whether the diagnosis of muscular dystrophy was correct in any of these 6 patients. He suggests that they in fact had polymyositis, and points out that in all the cases the onset of muscle weakness was more rapid than in typical muscular dystrophy. In 1 of the patients there was a history of transient dysphagia, a feeling of stiffness of the muscles, and mild Raynaud's phenomena (a sister also had attacks of coldness and pallor of the fingers), which might support the diagnosis of polymyositis; but the other cases would seem to be fairly typical examples of muscular dystrophy except for the rapid onset and their recovery.

The classification and ætiology of myositis are still disputed. In addition to bacterial infections, such as the rare suppurative myositis and gas-gangrene, and the parasitic infestations, such as trichinosis and toxoplasmosis, there is the condition variously known as dermatomyositis or polymyositis according to the degree of skin involvement. The ætiology of this condition is unknown, but it does not seem to be due to an infection. The essential pathological feature is acute hyaline necrosis of muscle-fibres[17] with interstitial cellular infiltration in the affected muscles. In the cases with relatively acute onset there may be skin eruptions; but in the slowly developing cases skin lesions are usually absent. The patients complain of considerable weakness and fatigability of the affected muscles, and in the later stages wasting and fibrous contractures are found. Commonly the muscles of deglutition, and sometimes the respiratory muscles, are involved. Some of these cases have a progressive downhill course; but others, particularly those with an acute onset, may become stationary and eventually recover. Polymyositis is rare, and the diagnosis is easily overlooked since it may mimic better-known disorders such as polyneuritis, myasthenia gravis,[18] and muscular dystrophy. Nattrass urges the importance of muscle biopsy in cases of apparent muscular disease. This is certainly valuable in many cases, but the interpretation of muscle lesions, especially in biopsy specimens, may be difficult. This difficulty is illustrated by the contrast between his statement that the pathological changes in polymyositis are very different from those of muscular dystrophy with that of Adams, Denny-Brown, and Pearson,[17] who say that "there is no essential difference between the most chronic changes seen in some muscle fibres in chronic forms of polymyositis and the changes that are seen in the more rapid forms of muscular dystrophy."

We cannot be sure whether these 6 cases reported by Nattrass and the few described previously were in fact polymyositis or muscular dystrophy which for some reason cleared up. But Nattrass's paper indicates the importance of further study of these rather neglected disorders of muscle, and also the need for careful thought before giving the usual gloomy prognosis in cases of apparent muscular dystrophy starting in childhood.

17. Adams, R. D., Denny-Brown, D., Pearson, C. M. Diseases of Muscle. London, 1953.
18. Matthews, W. B., Burne, J. C. *J. Neurol. Psychiat.* 1953, **16**, 49.

PALMAR BLOOD-SUPPLY

MOST incisions in the hand heal well, provided they are planned to follow the lines of the skin flexion-creases. But necrosis of the palm occasionally follows the wide-spread undermining of skin which may be necessary in the radical treatment of Dupuytren's contracture. Conway and Stark,[1] by injections of the hand in the cadaver, have brought to light two important anatomical facts. Firstly, in the centre of the palm the vessels are scanty, and this area is relatively ischæmic; whereas in the thenar and hypothenar eminences and in the fingers the vessels are more densely arranged. The areas of relatively great density correspond in general to areas in which arteriovenous anastomoses are found.[2] Secondly, the arterioles of the palm pass perpendicularly from the deeper vessels to the skin surface. From this study it is clear that extensive undermining in the palm may sever vessels passing to an area which is never well supplied with blood; and thus a second incision may be less damaging in the treatment of extensive contractures. When there is any doubt about the viability of the skin-flaps, a full-thickness skin-graft may produce more rapid healing and a sounder palm.

DIVERTICULITIS OF THE COLON

IN the past treatment of diverticulitis was defensive. Until a complication arose this disorder was regarded as a medical problem; if obstruction, fistula, or other complications supervened, colostomy was all that surgery offered. A more offensive note was struck by Welch et al.,[3] who suggested that uncomplicated diverticulitis must now be accepted as an important indication for operation. They reasoned that patients should be relieved of the unpleasantness of exacerbations, which tend to recur, that the longer symptoms persist the greater is the chance of complications, and that the earlier the operation the better is the opportunity for resection and the easier is it to do. 582 patients with this condition were seen by them at the Massachusetts General Hospital between 1942 and 1953; 114 required resection, and only 3 died; whereas among 13 patients in whom only colostomy or cæcostomy was done there were 4 deaths associated with operation. In a third of their cases it was possible to resect the area at one operation, but temporary colostomy was needed in the majority. Lloyd-Davies[4] also believes that it is advisable to intervene and resect before worse befalls the patient. Experience at St. Bartholomew's Hospital between 1923 and 1932, when no resection was done, supports this view, for of 34 cases admitted 15 died from complications and 14 had permanent colostomies.[5]

The decision to operate on the uncomplicated case is not always easy; but there should be no hesitation in patients under 50, in those who have had repeated attacks, or in those with urinary symptoms which presage the development of a colovesical fistula. Finally there are occasions when it is well-nigh impossible to exclude the possibility of carcinoma. Colock and Sass[6] have compared 50 patients having diverticulitis with a similar number suffering from carcinoma. The difference between these two groups was not so much in the character of the

1. Conway, H., Stark, R. B. *J. Bone Jt Surg.* 1954, **36A**, 1238.
2. Wood Jones, F. The Principles of Anatomy as Seen in the Hand. London, 1944.
3. Welch, C. F., Allen, A. W., Donaldson, G. A. *Ann. Surg.* 1953, **138**, 332.
4. Lloyd-Davies, O. V. *Proc. R. Soc. Med.* 1953, **46**, 407.
5. Todd, I. P. *Ann. R. Coll. Surg. Engl.* 1955, **16**, 118.
6. Colock, B. P., Sass, R. E. *Surg. Gynec. Obstet.* 1954, **99**, 627.

symptoms and signs as in their frequency; which confirms the difficulty of differentiation in individual cases. Where doubt remains resection is obligatory.

INACCURACY IN THE LABORATORY

Two years ago we referred to evidence that different biochemical laboratories might report very different results of analysis of the same sample.[1] Since then the International Association of Clinical Biochemists has made a survey, mainly in America and the countries of Western Europe; and we understand that the findings (not yet published) show that the situation is much the same in all the countries studied.

We suggested that it would be useful if someone supplied accurately analysed blood plasma or serum so that individuals could check their own analyses. Glaxo Laboratories Ltd. are now preparing batches of freeze-dried serum, and this material is being analysed by members of a joint committee set up by the Association of Clinical Pathologists and the Association of Clinical Biochemists. It is proposed to supply figures for the content of sodium, potassium, calcium, chloride, urea, glucose, and total protein. The samples are to be distributed by Messrs. C. Davis Keeler Ltd., 39, Wigmore Street, London, W.1, to whom all inquiries should be addressed. Large-scale production, and the good will of the firms concerned, have enabled the costs to be kept low, and it is expected that each sample will cost less than five shillings.

ELECTROPHORESIS OF SERUM-PROTEINS

IN 1937 Tiselius [2] separated the components of the plasma-proteins by boundary-electrophoretic analysis, and analysis by this method of normal [3–7] and pathological [4–10] sera has since been often recorded. The apparatus needed for boundary electrophoresis is complex and expensive, and its use entails much time and technical skill. But the development of zone-electrophoresis on filter-paper, with apparatus which is simple and cheap, has now brought the electrophoretic method of protein separation within the reach of most hospital laboratories.

McQueen et al.[11] have reviewed the results of paper-electrophoresis of serum-proteins in several different diseases. They conclude that the protein pattern is specific in collagen diseases, nephrosis, hepatic cirrhosis, and multiple myelomatosis. They have also found that serial observations are of great value in assessing the progress and activity of a disease, especially in collagen diseases and infective hepatitis. McQueen et al. suggest that paper-electrophoresis of the serum-proteins may replace the turbidity and flocculation tests for diagnosis and serial assessment of infective hepatitis. This enthusiasm is not shared by Church and Blackburn,[12] who found that electrophoresis of serum-proteins in cases of liver disease gave no more information than could have been obtained more simply from zinc-sulphate turbidity tests and estimations of total serum-proteins. Mackay and Volwiler [13] point out that the usefulness of paper-strip electrophoresis in routine diagnostic work is limited by the fact that changes in the serum-protein fractions are generally non-specific to any particular disease. Exceptions to this are γ-myelomatosis and agammaglobulinæmia, where the method may give results of diagnostic value. Mackay and Volwiler conclude that "quantitative reproducibility of paper electrophoretic analysis of serum appears satisfactory," but they do not claim the same precision as for boundary electrophoresis. The quantitative accuracy of paper-electrophoresis has been questioned by Martin and Franglen,[14] who also point out that the technique must be very careful if useful and reproducible qualitative results are to be obtained. It seems that the application of this method to clinical work would best be confined to qualitative assessment of the stained strip by someone experienced in such work. The results of quantitative analysis are often inaccurate and may be misleading.

INFUSIONS INTO BONE-MARROW

As long ago as 1922 Drinker et al.[15] and Doan,[16] working independently, showed that fluids infused into bone-marrow quickly reached the general circulation. Josefson[17] gave patients with pernicious anæmia liver extract by the medullary route; he noted transient reactions, but proposed that other drugs should be given by this route. But it was Tocantins et al.[18–22] who first made extensive use of intramedullary infusions of blood, saline, and dextrose solutions for replacement therapy. This method has been used for massive infusions in a case of ulcerative colitis; the patient received nearly 23 litres of blood and saline and dextrose solution into his sternal bone-marrow in nine days.[23] Until quite lately intramedullary infusions were given into the sternum or, less commonly, into the tibia [24] or femur [25]; and special instruments have been designed for penetrating the bone and delivering the infused fluid.[24 26] Pillar [27] has shown by injection of radio-opaque material into the ilial marrow that the injected material rapidly reaches the general circulation, thus confirming earlier observations.[18 21] He found that the crest of the ilium was a good site for infusion, because the capillary network inside the marrow is here more extensive than that in the sternum and most other bones, and because accidental perforation of the ilium does not endanger vital organs. He infused solutions of the vitamin-B complex, vitamin C, dextrose, and potassium chloride without ill effect.

Bone-marrow infusion is contra-indicated in cases of bacteræmia or septicæmia or even of extensive sepsis, as in generalised peritonitis, because of a real danger of causing osteomyelitis.[28 29] Mediastinitis [30 31] and perforation of the posterior table [26] have followed infusion into the sternum. There is some experimental evidence that infusion into marrow may cause fat-embolism,[32] but this complication has not been reported in man. Medullary infusion is unsuitable for continuous replacement or maintenance therapy over any length of time. Viscous fluids, such as blood, must be infused under pressure, so such an infusion needs constant attention. Nevertheless anyone with experience of protracted parenteral maintenance therapy must at some time have wondered whether a patient would die from lack of veins capable of receiving infusions; and it is in this type of case, and in those where veins are collapsed, that intra-osseous infusion is of greatest value.

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16. Doan, C. A. *Contr. Embryol. Carneg. Instn*, 1922, **14**, 27.
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Special Articles

THE ACTION OF CHLORPROMAZINE

REVIEW OF FRENCH WORK

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THE synthesis of chlorpromazine was the culmination of twenty years' research directed towards the discovery of a drug which would either prevent or modify the effects which follow irritation (as opposed to either simple section or stimulation) of sympathetic nerves (Decourt 1954, Reilly and Tournier 1954). These effects are known in France as the phenomena of Reilly and the syndrome of irritation. Reilly et al. (1934) described the condition first as "hæmorrhages, vascular and lymphatic lesions of the alimentary tract, produced by perisplanchnic injections of different substances," including very small doses of bacterial toxins, chemical irritants, and physical agents—e.g., trauma and electrical stimulation. Although the organs affected varied with the nerve irritated, the macroscopic and microscopic lesions did not vary and were non-specific. Hæmorrhage and necrosis of the suprarenal glands were a constant finding. The condition was rapidly fatal, the animals dying within a few hours in a state of cardiovascular collapse indistinguishable from irreversible shock. Animals which survived for a few days showed an accumulation of fat in the liver; this, however, could be prevented by section of the spinal cord at D7 and by denervation of the liver. Less intense irritation produced sclerosis and endarteritis. Renal fibrosis and hepatic cirrhosis have been reported.

Phenomena of Irritation

A feature of the syndrome is that the lesions are widespread and often far removed from the original site of irritation. Thus, violent irritation of the splanchnic nerve, besides causing visceral lesions, can induce intense cerebral congestion, perivascular and pericellular œdema, and even hæmorrhages.

Reilly and Tournier (1954) admit that, if the phenomena of irritation only appear after contact of the noxious agent with autonomic nerves, one might argue that an arbitrary experiment has little resemblance to the conditions in acute infections and toxæmias. These workers, however, have produced both the visceral and cerebral lesions by injecting irritants into any mucosa rich in autonomic nerve-fibres, particularly the pharyngeal mucosa.

The widely different pathological lesions which can follow an acute infection of the pharynx and neighbouring structures are well known, and in this instance there is a close parallel between the experimental findings and clinical experience.

Reilly's work was confirmed by other workers in France (Gastinel and Conte 1936, Pham 1935).

Tardieu (1942) produced typical visceral lesions by irritating the cerebral peduncles and by injecting an infinitesimally small dose of typhoid antigen into the third ventricle of a dog; this immediately induced a typical "typhoid state."

The necropsy findings in patients dying from acute fulminating infectious states were shown by Marquezy et al. (1938) to be the same as those produced experimentally by irritating the nerves. They concluded that these states were the result of the action of the bacterial toxins on autonomic nerves and not on the capillaries or the cells of the organs affected, as is generally believed.

Relation to Reaction of Alarm

Decourt (1951) has compared lesions described by Selye as following the reaction of alarm with the phenomena of Reilly. The macroscopic and microscopic appearances of both the acute and the chronic lesions are very much alike. Reilly, however, produces the effects by placing irritants in direct contact with, or in close proximity to, autonomic nerves in amounts which would be innocuous by injection elsewhere. Selye, on the other hand, applies in an arbitrary and widespread fashion more powerful irritants, which have therefore only an indirect effect on the autonomic nervous system.

Ætiology

There is a strong difference of opinion about the cause of the lesions. Selye (1952) attributes only a minor rôle to autonomic disturbance but does not explain how the vital pituitary-adrenal responses are brought into action.

Reilly attaches little importance to endocrine response to irritation but admits it may play a part. He appears convinced that reflex autonomic nervous activity is the cause of his phenomena. He cites experiments by Tardieu et al. (1954) which show the existence of pathogenic impulses passing from the brain to the periphery during the evolution of the phenomena of Reilly. These impulses are believed to pass through the sympathetic nerves.

Attempts to Prevent Phenomena of Irritation

It appeared logical to search for a drug which would prevent reflex sympathetic activity, which appeared to be directly connected with the phenomena. Since 1935 extensive but unsuccessful trials have been made with antagonists of adrenaline, ganglion-blocking drugs, pituitary extracts, procaine, and atropine, alone and in combination, and in a very high dosage (Tardieu et al. 1954).

Tinel et al. (1935) suggested that the phenomena were caused by histamine released by an axon-reflex. Synthesis and trial of many anti-histamine drugs showed that these were quite ineffective (Decourt 1954). Clinicians, however, claimed that phenothiazine derivatives, especially promethazine and diethazine, in association with general anæsthesia reduced both surgical shock and the amount of anæsthetic agents required (Laborit 1950). Similar claims were made for ganglion-blocking drugs and even for curare (Romani 1952, Laborit 1948).

Chlorpromazine

It was not until chlorpromazine (a phenothiazine resembling promethazine) became available, that any significant progress was made in preventing the effects of both peripheral and central irritation. With this drug Reilly et al. (1953) and Reilly and Tournier (1954) protected 70% of guineapigs against splanchnic irritation, which was fatal to 90% of controls. The dosage was 5 mg. per kg. of body-weight, which is admittedly large. These workers showed that the addition of ganglion-blocking and anti-histamine drugs did not offer any advantage. Cooling was useless; indeed the prevention of hypothermia appeared to hasten recovery.

This work only established the protective value of chlorpromazine. Its use in high dosage when a toxic state was established appeared to intensify it and to hasten the end. Smaller doses, increased gradually, prolonged survival but did not decrease mortality.

The central action of chlorpromazine was established after intraventricular injection of a dose of 1 mg. per kg. of body-weight produced reversible narcosis and prevented the hypertensive responses which normally follow stimulation of the central end of the cut vagus nerve (Cathala and Pocidalo 1952).

With chlorpromazine Tardieu et al. (1954) and Pocidalo and Tardieu (1954) prevented the effects of irritation of the cerebral peduncles caused by injecting necrosing solutions. Normally the animals died within a few hours, showing typical pulmonary and intestinal hæmorrhagic lesions with vasomotor collapse. Preventive administration of chlor-

promazine by intravenous infusion either attenuated or inhibited these effects.

It is significant that all the successful work in preventing the phenomena of Reilly was achieved by using chlorpromazine alone. The temperature-reducing properties of chlorpromazine were not considered important. No curative properties were claimed for chlorpromazine, and its action appeared essentially preventive.

Mode of Action

It is now generally acknowledged that chlorpromazine does not possess ganglion-blocking properties resembling those of the methonium compounds (Decourt et al. 1953b, Huidobro 1954). Courvoisier et al. (1953) orginally suggested this properly because they observed an antagonism to acetylcholine, and prevention of the effects of stimulation of the peripheral end of the cut vagus. In a concentration 10 mg. per kg. of body-weight chlorpromazine depresses the ganglionic cell directly and reduces its activity (Decourt 1954).

Its anti-adrenaline properties cannot explain the effectiveness in countering the syndrome of irritation, because in the past equally potent anti-adrenaline drugs have not been of any experimental or clinical value (Decourt 1953, Tardieu 1954a and b). Therefore its central action is the property which deserves consideration and may explain its reported value in such a wide variety of clinical states.

Terzian (1952) noted that the electro-encephalograms of animals under the influence of chlorpromazine closely resembled those of physiological sleep. This indicated an activity on the centre of wakefulness situated in the anterior part of the reticular formations of the mid-brain.

Angeleri et al. (1954) confirmed this action on the reticular formations and noted that there was little or no modification of cortical sensory activity, although activity of the reticular formations was abolished. Hiebel et al. (1954), who made a detailed study of the action of chlorpromazine describe three ways in which it acts on the reticular formations :

(1) Chlorpromazine suppresses the disturbances activated through the reticular formations as the result of sensory or nociceptive stimuli. It shares this property with promethazine and small doses of narcotics—e.g., chloralose and barbiturates. The greatest effect, however, is obtained in strength of 1 mg. per kg. of body-weight, and increase of dosage never produces either deep anæsthesia or the cortical tracings typical of that state.

(2) Chlorpromazine also suppresses the central activating effects of peripheral sympathetic discharges or of the injection of a small dose of adrenaline, which Bonvallet et al. (1953, 1954) have shown to be caused by a humoral mechanism. It is suggested that the peripheral anti-adrenaline action of chlorpromazine may be active here.

(3) Chlorpromazine has been shown to unmask the inhibition of the reticular formations which follows distension of the carotid sinus. This action is usually obscured by the peripheral stimuli which would accompany this distension under normal conditions.

After reviewing recent neurophysiological research into the relationship between the cortex and the reticular formations Hiebel et al. (1954) recall that the reticular formations are believed to play an important part in conscious and autonomic activity, and that depression of the reticular formations may have far-reaching consequences :

(1) Chlorpromazine can considerably decrease the state of wakefulness and raise its threshold without causing narcosis.

(2) Since the reticular formations control muscle tone, their depression will be followed by a decrease in muscle tone, as observed by Burn (1954).

(3) The reticular formations control body-temperature, vomiting, and sympathetic tone, and an over-all depression in their activities can be expected from chlorpromazine.

(4) The activation of the anterior lobe of the pituitary gland after aggression has been linked with a central action of adrenaline in the region of the corpora mammillaria and the posterior part of the hypothalamus, which in particular control the secretion of corticotrophin. Hiebel et al. (1954) suggest that there is no doubt that chlorpromazine could depress the activity of adrenaline in this part of the brain.

This last suggestion has been investigated by several workers, and in animals the suppression by chlorpromazine of pituitary-adrenal response to stress has been shown by Aron et al. (1953) and Castaigne (1954) after Benos (1951) had shown that promethazine depressed the response.

Castaigne (1954) bases his report on experience of the action of chlorpromazine on more than 2000 rats, in which he induced general anæsthesia more than 4000 times. He is careful not to draw conclusions about man from this work, for the doses used exceed the clinical dosage. His findings are, however, of great importance in that they point the way to future research into the action of chlorpromazine in man, especially in association with general anæsthesia.

Castaigne has shown in the rat that the addition of chlorpromazine (50 mg. per kg.) to an anæsthetic agent completely suppresses the pituitary-adrenal response to aggression or stress. This medicinal hypophysectomy is transitory and does not affect the subsequent reactivity of the pituitary gland. The suprarenal glands still react to the injection of corticotrophin while the rat is under the action of chlorpromazine.

" Lytic cocktails " do not give such clear-cut results as does chlorpromazine alone, and full hibernation (with cooling) increases mortality. Chlorpromazine and anæsthesia, which are not toxic to the healthy rat, become toxic when the rat is cooled. Castaigne thinks that chlorpromazine would increase the toxicity of any of the drugs in the lytic cocktail. The action is independent of sleep and has been observed in rats which did not sleep. The gonadotropic hormones are also suppressed, and probably all the functions of the anterior lobe of the pituitary gland are affected.

In large dosage oliguria was observed, which could be rapidly turned into diuresis by injecting whole-pituitary extract. This does not suggest any direct action on the kidney but indicates depression of the central mechanisms which control diuresis.

Holzbauer and Vogt (1954) have been unable to confirm the findings of the French workers. This is explained partly by the smaller doses used (15 mg. per kg.) and failure to allow sufficient time to elapse, and partly by differences in experimental technique (Castaigne 1955).

All the evidence therefore emphasises the importance of the central action of chlorpromazine. Both Hiebel et al. and Castaigne refer to the work of Decourt, who has shown that chlorpromazine is the most powerful of many substances which depress cellular activity in a particular fashion, which he calls narcobiosis.

It appears from the experimental work just described that both chlorpromazine and promethazine possess similar central actions, although peripherally one opposes histamine and the other adrenaline.

This common central action was observed by Decourt (1953) who recalled that Hess (1925), Sivadjian (1934), and Bovet (1935) had described a similar central action for both natural and synthetic drugs which oppose the peripheral action of adrenaline. These actions were as follows :

(1) A purely hypnotic action.

(2) Intensification (or potentialisation) of the action of hypnotics and analgesics.

(3) A central anti-emetic action.

(4) A central hypothermic action.

(5) A central antidiuretic action.

(6) Inhibition of conditioned reflexes.

(7) Intensification of local anæsthetic action.

Decourt (1953) classes all drugs which show this common central action in one group irrespective of their peripheral action, which may neutralise either acetylcholine, histamine, or adrenaline on muscle or glandular cells. Since these cells are non-nervous in origin, he contends that this shows a universal depressant action on all cellular life. He and his colleagues demonstrated a reversible depression of cellular activity in various unicellular organisms possessing no nervous systems—e.g., bacteria, microscopic fungi, infusoria, and sea urchins' eggs—(Decourt and Anguera 1953, Decourt et al. 1953a and c). Furthermore a direct relationship was established, through fishes, between the active concentrations for unicellular organisms and those active for higher animals. Fishes were equally affected whether placed in a medium containing the drugs in concentrations active on lower organisms or on receiving an injection in a dosage active on higher animals (Decourt et al. 1954).

Chlorpromazine and promethazine showed the highest activity of the many drugs tested, their minimal active concentration being 1 in 400,000 and 1 in 200,000 respectively, far in excess of the other drugs. The fact that anaerobic bacteria were susceptible to this action suggests that there is no direct interference with oxidative processes. Coliform bacilli appeared resistant, and it is suggested that their high content of diastases may explain this resistance and provide a clue to the physiochemical action of these drugs.

The presence of a quaternary amine reduces this depressant activity. The substitution of a quaternary amine for the tertiary amine present in promethazine to form 'Multergan' (thiazinamium) reduces the minimal active depressant concentration from 1 in 200,000 to 1 in 1000—a two-hundred-fold reduction in activity (Decourt 1953).

Decourt points out that the histological structure of the reticular formations renders them particularly susceptible to narcobiotic action. The reticular formations are made up of numerous nerve-cells with short axons and multiple dendrites which intercommunicate freely. An impulse passing through this part of the brain will pass through many cells before leaving as an effector impulse. If each cell is depressed, its ability both to receive and to transmit impulses will be reduced. The impulse, on passing through a series of cells, will rapidly become attenuated and its strength fall to subliminal intensity before it reaches its objective.

On the other hand, cortical motor and sensory cells are characterised by long axons and few dendrites. Impulses pass through relatively few cells; hence in such cells a cumulative depressive effect of chlorpromazine is not observed.

This concept is in line with current neurophysiological work, for physiologists recognise the polysynaptic nature of the reticular formations (Moruzzi 1951).

Summary and Conclusions

The synthesis of chlorpromazine was the culmination of twenty years' continuous research in France aimed at discovering a drug which would prevent the lesions which follow irritation of sympathetic nerves.

These lesions resemble closely those described by Selye which follow acute non-specific aggression and are produced by the pituitary-adrenal response to this aggression.

Experiments have been described which show that chlorpromazine alone can prevent the effects of sympathetic irritation and the responses of the pituitary-adrenal mechanism to non-specific aggression.

It is suggested that these results are obtained through a highly developed central depressant action on the reticular formations of the brain, combined with powerful peripheral antagonism to adrenaline.

The reticular formations are believed to contain centres which control vomiting, heat regulation, wakefulness, vasomotor tone, muscle tone, and secretion of the anterior lobe of the pituitary gland. A general depression of this region will have far-reaching effects and explains the diversity of action claimed for chlorpromazine.

Chlorpromazine in high dilution has a reversible depressant action on all forms of cellular life. It does not appear to affect oxidative processes directly, because anaerobic organisms are susceptible to this action.

In clinical dosage (up to 1 mg. per kg. of body-weight) it probably depresses individual cells in proportion to their activity. In this way nervous cells would be more affected. The action of chlorpromazine is predominantly exerted on the reticular formations because the polysynaptic structure of this part of the brain facilitates a cumulative depressant effect on the passage of impulses through a large number of depressed cells.

Though chlorpromazine does not exert any direct action on cells of vital organs, possibly such cells that are already poisoned by endogenous or exogenous toxins might be still further depressed, with an intensification of toxic symptoms.

The central action of small doses of chlorpromazine closely resembles that of general anæsthetics, but larger doses do not produce anæsthesia.

The value of chlorpromazine in clinical medicine depends on how far the phenomena of Reilly and the theories of Selye are accepted. If the reactions they describe play a major part in all infections and trauma, chlorpromazine and allied drugs are worthy of careful investigation and consideration. There is already a widespread impression in France and in this country that chlorpromazine and promethazine reduce surgical shock and postoperative morbidity and fatigue. The experimental findings offer an explanation, and the extent to which this impression is true can only be decided after further clinical study.

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SOME NEW HORIZONS

Meeting of the National League of Hospital Friends

Two years ago Mr. Iain Macleod,[1] the Minister of Health, urged the Friends of Hospitals to concentrate first on the plight of the mentally ill and the chronic sick; and they have been doing so. At this year's annual meeting, held in London on March 9, with Mr. J. P. WETENHALL, chairman of the league, presiding, a large gathering heard of fresh directions in which they might extend their services.

THE AGED IN THEIR HOMES

Dr. E. B. BROOKE, physician-superintendent of the St. Helier Hospital, Carshalton, spoke with warm gratitude of the work done by friends of hospitals, but added that there is still a vast amount of virgin soil for them to till. The aged sick in their own homes are particularly in need of help; for though it is true that "home—other things being equal—is the best place for everybody," yet for neglected old people it can be the scene of tragedy, and sometimes the tragedy happens while they are waiting for a hospital bed. He suggested that friends of hospitals might take on not only old people in the wards but old people on the waiting-lists. Some of these, faced with long invalidism, are alone and friendless; others are looked after with great devotion by relatives, who may themselves be old and ill. Hospitals are now beginning to establish geriatric units, and some send out a geriatric team to visit the home before the patient is admitted to hospital, and assess both the urgency of his case and his immediate needs. Hospital friends could be the link between him and hospital while he is waiting for a bed, help him on his return home, and provide him (from a special fund) with the amenities and gadgets he requires. He could thus rely on the continued friendship of the same friends, to whom he and his relatives could turn if at any time the responsibility became too great for them. Geriatric units are multiplying: there are about 60 in the country now. Dr. Brooke suggested that the league might start forming "Friends of Geriatric Units." Some of the members, he thought, might serve a short apprenticeship with the almoner and social worker, and these could teach old people diversional therapy in their own homes. Others might collect funds for equipment—books, magazines, wireless sets, material for occupational therapy, gadgets to help the handicapped, clothes, and so forth. Others might maintain a flying squad of helpers willing to tide old people over crises in their homes until a hospital bed became available. He quoted some moving cases: a woman of 70 with cataract of one eye and incipient cataract of the other, looking after a husband of 93 with senile dementia and a brother of 82 with pneumonia; a man of 79 living alone, washed and fed by a neighbour of 84; a woman of 84 living in a damp isolated bungalow and writing to beg that a bed might be found for her old demented husband before the weather became too cold for him, and she too tired to carry on. Many old people are occupying hospital beds who no longer need full hospital care; and their beds are badly needed by others. Many could be discharged if we had more half-way houses, and more complete domiciliary services—meals, laundry, chiropody, transport to hospital for treatment, and the like. The hospital should also arrange (as some now do) to take old people in for short periods to give tired relatives a holiday. Meanwhile there are great opportunities for voluntary workers to help, and the leagues of friends, who have brought "a leaven of real hospitality into the hospitals," can carry the same leaven into patient's homes.

Dr. T. P. REES, physician-superintendent of Warlingham Park Hospital, said that little voluntary work has as yet been done in mental hospitals. Most of them were built in the last century, by the State or by local authorities; and because of the widespread unreasoning fear of mental illness the walls were high and the doors locked: to visit them was an ordeal. Mental hospitals differ from general hospitals in that most of their patients are up and about. They also differ from them, and always will, in this: whereas the general hospitals bury their failures, the mental hospitals keep them. Since these long-stay patients usually live out their full span, they form a large proportion of the resident population, and distract the visitor's attention from the fact that nearly 80% of all patients admitted to mental hospitals are discharged within twelve months. Yet the standard of a mental hospital must be judged, he holds, not by what it does for its recoverable cases but by what it does for its helpless and chronic patients. Before the Mental Treatment Act, 1930, patients could only be admitted under certificate, but since then more and more have been admitted as voluntary patients and these now form about 70% of all admissions. Some hospitals are admitting patients without getting them to sign anything at all—"non-statutory" patients. Patients entering a general hospital, they say, are not obliged to sign anything, so why should a patient who wants to enter a mental hospital? A voluntary patient can leave hospital after giving seventy-two hours' notice; a non-statutory patient, like a patient in a general hospital, can discharge himself at any time he likes. Fences and walls round many mental hospitals are being pulled down. The fences taken from one mental hospital were put up again to protect the local park—an interesting comment on behaviour inside and outside the mental hospital. Locked doors, too, are steadily becoming fewer. Some psychiatrists now believe that locked doors make patients worse; and certainly fewer run away when the doors are open: there is no fun in running away through an open door. The public are visiting mental hospitals much more freely than they used to do, and many of the hospitals are now holding "open" days. All these changes are making it easier to get voluntary help. Warlingham Park has had, since 1947, a league of hospital friends who have done good work in arranging outings for patients and befriending those who have no visitors. Advances in the medical treatment of the mentally ill have been striking in the last twenty years; but mental illness is not a purely medical problem: it is a social problem, which calls for the coöperation of doctors, nurses, social workers, occupational therapists, friends, relatives, employers, and the patient himself. The task of all of them is to teach the patient how to live; and this is not always best done behind locked doors. An increasing proportion of patients, Dr. Rees believes, should be treated in their own homes. But there will always be some who need hospital care, and for these the aim should be to make the hospital as little like a prison as possible, and to let patients, while they are in it, live as normally as possible. Some recover in hospital but relapse on discharge: "surely this means," Dr. Rees said, "that there was something wrong with the treatment: we should have taught them how to live at home." The hospital should be a therapeutic community, and there is a job in it for everyone concerned with the patient. At Warlingham Park monthly discussion groups are held in each ward, at which patients, doctors, nurses, social workers, and friends of the hospital all meet and talk; and all gain a better insight into the problems of the patient, and help to make his return to hospital less likely. Voluntary workers can help patients before they come into hospital, afterwards in their homes, and at patients' social clubs. "There is no limit," he told his listeners, "to the work you can do to help us."

Dr. ELIZABETH TYLDEN, assistant physician to the psychiatric department of Bromley Hospital, described

1. *Lancet*, 1953, i, 191.

how an outpatients' club—the Stepping Stones Club—has been formed. A team of four (three psychiatrists and a psychiatric social worker) found they had to treat the psychiatric outpatients of an area with a steeply rising population, and no increase in mental-hospital beds; but Bromley Hospital has a large and active outpatient occupational-therapy department. The psychiatric team tried the effect of sending some of their elderly patients there for several days every week, and something striking happened: a lonely, depressed, introspective, somewhat paranoid woman was put at a table with three blind men who taught her how to make baskets; after a few weeks she was saying: "I think I've been worrying too much about myself; can't I do something to help these other people?" This kind of thing happened not once but many times. At first little jobs were found for such people in the hospital; then, as these ran out, a system of good-neighbourliness was started in which the Friends of Bromley Hospital (who had existed long before they became a league with a name) and the five local branches of the Townswomen's Guild joined in. It was found that many lonely old people who had been deteriorating could be kept well in their own homes when they were visited, helped, and taken to regular gatherings at the houses of the voluntary workers. Younger patients joined a music and singing group arranged by one of the hospital friends; and another friend started an art-therapy group. Several patients wanted a drama group, and this has flourished: two patients who had given up going outside their own homes at all were persuaded to join and are now leading a normal social life. Four voluntary workers started a play group for children attending the child-guidance clinic; and while this was in progress the mothers attended a discussion group with the doctors and social workers in a neighbouring room. The results of these activities have been encouraging. Mothers are handling their children better; and some patients have found the self-confidence to start on a course of training or to return to a profession they had given up. Finally the voluntary workers held a meeting: they wanted to be an organisation and to be properly housed. So the Stepping Stones Club was formed, in which patients can progress from group to group, learning to live with other people, and to take their share of social responsibility. The Friends of Bromley Hospital have helped not only with service but with generous grants. Dr. Tylden hopes that, possibly with help from King Edward's Hospital Fund for London, the time will soon come when the outpatient clinic and the club have their own house, to which patients can come any day and find something going on, and someone to help them to join in.

The message of the three speakers, THE CHAIRMAN said, was "Go out and work harder." He was supported in this opinion by LORD BEVERIDGE, who had been much moved, by the sense of mission, the humour, and the humanity of the speakers. He is always being told, he said, that he is responsible for the Welfare State, and he always takes the opportunity of repudiating it. The term "Welfare State" suggests that only an official can do good to his neighbours: but what we really want is a "welfare society"—an enlargement of what the family does for its members. The League of Friends of Hospitals, he said, is doing this very thing—going out and, by personal friendship, personal action, enlarging the family.

Public Health

THE NEED FOR OVERLAPPING*

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IN the pursuit of new knowledge opportunity is nowadays almost limited to the specialist. Yet never in the history of medicine has it been more necessary to have a doctor who can look on the individual as a whole. What perturbs me—as an administrative medical officer of health who is trying to see that health amenities and medical facilities of the highest order are available to every person within his community—is to see the "iron curtains" that are being set up between the different specialties in such a way that the individual is confined by one or other. These barriers are being set up not only between the medical and other social services but between the different branches and specialties of medicine itself.

When Sir William Beveridge and his committee were asked to prepare a scheme to provide social security for the people of this country, he made it clear in his famous report, that there were five "giants" in the road of reconstruction. These were named as Want, Disease, Ignorance, Squalor, and Idleness. He insisted that they formed a united obstruction to progress and that they had to be fought singly and together if we were to conquer them. You will notice that disease is but one of these giants; and, though by the National Health Service an attempt has been made to organise the resources of medicine to fight this one great giant, nobody intended that this struggle should take place beyond an iron curtain—away from the other struggles for social improvement. If it is to fight disease effectively, the medical profession as a whole needs in fact to be more than interested in the social services that are fighting the other giants of the Beveridge report. Yet what we are actually seeing is a flight by the profession back to the hospital ward, the laboratory, and the X-ray room—where the doctor is isolated from the general life and struggles of the patient as an individual and a member of the community.

I have lived long enough to see several attempts made to remove the curtain between clinical medicine, as practised in hospitals and institutions, and the person in his home and at work. The chair of preventive medicine at the University of Bristol was one of the first to be established in this country, and the intention was that it should be a link between medical institutions and the world outside. Clearly before such a scheme could function it must offer a service, and in Bristol at that time—21 years ago—it offered a laboratory service and the resources of the public-health department, including X rays for diagnosis in a limited field.

Also I was privileged to be a member of the advisory council of the Nuffield Provincial Hospitals Trust, when Sir Farquhar Buzzard, and later John Ryle, took up the cudgels on behalf of "social medicine." Once again the idea was to persuade the clinicians that environment, and in particular its social aspect, was of tremendous importance in the maintenance of good health and in the causation and cure of disease.

I fear that in neither case has the campaign had a very lasting effect. Are not the sympathy and interest of the ordinary man in the quick cure, rather than in the long-drawn-out régime of prevention? The physician himself is influenced by the attitude of the patient to prevention and treatment, and the discovery of the sulphonamides and the antibiotics has made the lot of

* From an address to the conference of the National Association for the Prevention of Tuberculosis, held at Bristol, on Sept. 27, 1954.

preventive medicine harder and the glamour of cure even more alluring. Indeed, it would appear that the discovery of cures and more cures makes prevention less and less necessary. Nature, however, is not as transparent as all that: who can venture to say that a cured person, even under most advantageous circumstances, has been completely restored to his pre-illness state? Nor, as I see it, can we ever hope for a 100% cure of all diseases. I am convinced therefore that there will be an important task for preventive medicine to face for a long time to come.

BORDERLANDS

If specialisation must continue and if we are to break down barriers within our profession, as well as between our profession and the others that are trying to make living fuller and healthier, we shall have to develop teams of skilled workers whose activities overlap. To the tidy administrator there is no more hideous bogy than "overlapping." It means waste, bickering, discussion, and delay. The alternative, however, is an iron curtain or perhaps a gap. After many years' experience I am convinced that a certain amount of overlapping between the services is essential if we are to get the best results. Overlapping does also mean common interest, with all the advantages of consultations and two or more opinions from different standpoints of the problem under consideration, and the pooling of resources for its solution.

For example, though public health and preventive medicine are concerned with the promotion of normal health and the prevention of disease, the boundaries of normal health are very uncertain and the practitioner of preventive medicine should be able and encouraged to diagnose deviation from the normal both in the individual and in the group. This borderland of disease is as important to the public-health practitioner as it is to the physician or surgeon responsible for treatment. This borderland is ground for common interest between public-health and the treatment services. Full facilities should be available to both parties in the field of diagnosis: overlapping is essential to create common interest, an examination of the problem from the different points of view, and therefore to create better prospects of a solution.

The public-health service today is much handicapped by lack of ancillary services to aid it in the detection of "deviation from the normal," and until that deficiency is made up it cannot be efficient. The school-health, maternal, and child-welfare services would be vastly improved throughout the country if they were encouraged by the supply of most modern equipment needed for diagnosis instead of being handicapped by red tape and confused by legal jargon.

My progressive and not too poor local authority has been impressed by these arguments and has purchased, in spite of much obstruction, out of revenue, an X-ray apparatus with a miniature camera. It hires out the service to the different sections—school health, maternal and child-welfare, and others. In this way we are able to get on with the work without having to worry and wait for the assistance of the hospitals.

It is, of course, too true that in the past, when local authorities had more power than they possess today, many of them failed to use it, partly from short-sightedness and partly from lack of funds; but that does not justify the highest authority in the land in acting like an unwise teacher and trying to do the work itself. Surely the aim of our civilisation is to get every person and community—even an elected local authority—to stand on his or its own feet? A lesson may be learnt from voluntary organisations like the Diabetic Association, whose avowed object is to teach all diabetics to be as independent as possible.

COMPARTMENTALISM AND TUBERCULOSIS

In spite of treatment tuberculosis remains far too prevalent in this country, and prevention is our chief hope of exterminating it. To that end we would all agree that ascertainment—as complete as possible—is the first step; and I regard it as a mistake to erect barriers that will prevent anybody, any organisation, any authority from doing all they can to bring cases of tuberculosis to light. There must be publicity and health education, and in this borderland there is room for every kind of organisation to play a part. Overlapping in its most extravagant form can never be as expensive in life or cost as the havoc created by this disease.

The recent report by a Medical Research Council subcommittee on Mass Miniature Radiography contained arguments which show that the M.M.R. is a valuable arm of the preventive service. Yet the conclusions contained no mention of the public-health department and the part it should play; and this attitude is supported by the Ministry of Health. Surely this preventive instrument ought to be in the hands of the public-health department, which has all the advantages of being in touch with the people, to organise and to run as one of its primary duties.

This M.M.R. organisation illustrates the dangers of trying to define rigidly the responsibilities of the different bodies fighting disease and promoting human welfare. The practical social workers, doctors, and others must have elbow room to manœuvre. The tendency, however, has been—and, one might even say, usually is—for his course to be set rigidly by the lawyer and the administrator. The path of progress is unlikely to be discovered that way—this is a fit task for the free explorer only.

Arsenic in Food

The Food Standards Committee has adopted the revised report of its metallic contamination subcommittee concerning the limitation of arsenic in foods.[1] The general limits recommended are 0·1 part arsenic per million in ready-to-drink beverages and 1·0 part per million in other foods. New limits are suggested for concentrated foods and for food adjuncts which enter the diet only in small quantities (soft drinks intended for consumption after dilution, ice-cream, iced lollies, chemicals used as ingredients or in the preparation or processing of food, &c.). The subcommittee also recommends that the sale of sea-foods containing arsenic in excess of 1·0 part per million should be permitted where the arsenic in them can be shown to be natural.

Before implementing the recommendations the Minister of Food has agreed to consider further representations from interested parties. These should be sent to the assistant secretary, Food Standards and Hygiene Division, Ministry of Food, Great Westminster House, Horseferry Road, London, S.W.1, not later than May 31, 1955.

Influenza

This winter's outbreak of influenza due to the B virus[2] is abating. In the 160 great towns of England and Wales deaths attributed to influenza in each of the ten weeks from that ended Jan. 1 to that ended March 5 numbered 82, 102, 134, 136, 123, 106, 84, 82, 81, and 70; and deaths from pneumonia numbered 380, 417, 471, 557, 534, 449, 387, 357, 429, and 449.

New claims on the Ministry of Pensions and National Insurance in each of the seven weeks from that ended Jan. 18 to that ended March 1 were as follows: 243,349, 257,091, 232,929, 208,935, 192,396, 193,523, and 208,434.

The Ministry of Health remarks that the delayed fall in deaths from pneumonia and the lag in the drop of first claims may be due in most areas to the bad weather rather than to influenza.

1. Food Standards Committee: Report on Arsenic. H.M. Stationery Office. 1955. Pp. 5. 4*d*.
2. See *Lancet*, Feb. 5, 1955, p. 300.

The Widdicombe File

XXIII. NOLI EPISCOPARI

DEAR CHARLES,

IT was nice of you to write to me about the chair at Mingara. No, Charles, it's no go. Three years ago when it was first advertised, and again now, I can promise you I thought about it most carefully. "I have considered this matter, I have decided this matter, I will speak plain and clear. This is my irrevocable judgment from which there is no appeal." I cannot come out to Mingara.

It hasn't been an easy decision to make. As you know, I saw Mingara both in calm and in calamity during the war, and acquired a considerable affection both for the place and its people. I hanker more than a little after being one of those who

> "in Khyber or Khartoum
> Trimming their nails to meet an east wind
> Justify the system."

I know you badly need a head for the department, and I think I could do the job. I'm not so sure of a chair in this country—who, in this pyramidal profession, can be?—that the prospect of hearing myself called Professor is not a very real attraction. But I can't do it, Charles. I'm too old. Thirty-eight, yes, and too old.

It's more than a little on my conscience, for I'm fairly sure that I'd be doing more good in the world with you in Mingara than snug at home here at St. Ethelred's. My reasons are, I'm afraid, selfish ones. But I think it may be worth airing them, for my reasons are those of very many men who ought to be taking jobs in Colonial universities but won't.

You need, as I see it, three sorts of people on the staff of a newish Colonial university—the permanents, the locals, and the transients. Permanents like you are the blessed indispensable backbone; and it would be a poor university that wasn't beginning to produce at least a few local people good enough for senior jobs. But it's the transients that I'm mostly concerned with here. And I hope you won't regard it as an insult to the other two classes if I say that good transients are essential if Mingara is to remain a live university. That's not because it's tropical, or new, or because the Mingarans are mañana-ish or too much on the make, or any such balderdash. It's simply a question of isolation. Inbreeding in a university is always bad: to an isolated university it is fatal. Guy's may be too full of Guy's men and Barts of Barts men, but at least they meet each other often, and even, greatly condescending, may sometimes attend a meeting at Ethelred's. Even in this bandbox of an island, the medical schools which are furthest from their neighbours—Aberdeen, Newcastle, Bristol—have to make a more definite effort to keep in the swim (which is not to say they don't make it) than London, Glasgow, or Manchester. Mingara is 2000 miles, more or less, from the next medical school, and even in these days of the Comet (alas, that our comet has had its tail twisted) that is a long way, and even worse an expensive way, to drop in to hear an interesting paper or discuss a common problem.

An isolated school must rotate a substantial part of its staff with other universities if it's not to stagnate. Sabbatical years, visiting professorships, travelling fellowships—all these help: but nothing can replace the repeated infusion of new blood. The advantage isn't all one-sided: we benefit greatly by the return of those who've seen a different-coloured world at close quarters, and as you get better that will count for more and more. But what is merely good for us is life itself for you.

Of course this country's not your only source. Americans are mostly too expensive, and Europeans talk the wrong languages; but there's the rest of the Commonwealth. You'll exchange of course with other Colonial universities, and most of the Dominions are open too—isolation is just as much of a problem with lots of the Dominion universities as it is with you, though they only sporadically realise it. And so far as we are concerned, there are several independent countries—mostly Middle Eastern—where we used to fill medical teaching posts and where (judged by persistent advertisements) we are still wanted and won't go.

Why won't we go? Why, specifically, won't I come to Mingara? You offer me a reasonable department, a superabundance of research problems, a job well worth doing; and with it a very adequate wage, a climate the kids would revel in, and a release from the washing-up and all that goes with it. (Beatrice is scared of native boys, but it would be no end good for her.)

Basically, it's very simply this. *How do I get back?* I could serve you optimally for five or six years—perhaps eight at the most. It would be wasteful to go for less. After six years it would be time for me to leave my outpost, let a fresh mind take over, and come home to have a little of the self-conceit knocked out of me (it affects different people in different ways, but I know that if I was the only accepted fountainhead of knowledge of my subject for a thousand miles my head would swell insufferably). Moreover the kids would be by then in boarding-schools in England, and Beatrice would be itching to be home beside them, and all the worst features of life in the tropics would be emphasising themselves to us. So for your sake and my sake equally, I ought to come home. But what to? What job could I count on coming home to?

It is, I think, literally true that there isn't a single chair in a medical subject in this country held by anyone who's previously held a Colonial chair—outside tropical medicine (and I know of only one in that even). If there are any exceptions, they must be very few. Now I presume—and I very much hope I am right in presuming—that you'd not appoint me to a chair in Mingara unless you thought me good enough to hold a chair in this country, or anyhow likely to to be good enough in a few years' time. But if I come out to Mingara, it seems that only exceptional good luck will get me back where I started, 2/i/c of a teaching department, and that I will be fairly lucky to get even a decent non-teaching-hospital consultant post. Competition is keen and the best jobs go to those who've stayed on or near the spot.

It is one of the paradoxes of a progressive profession that the buckets that leak fastest stay fullest. The faster one's young men rush off to better jobs elsewhere, the faster others throng to replace them. Even in chairs there is a hierarchy: no-one minds starting at the bottom of the ladder, but no-one willingly chooses the ladder with no top to it.

What's to do about it? Things will get better as you get more established, and as the influence of the war (which has made teachers mature older and so less mobile) recedes, and as we get more overcrowded. And you will always get the few idealists and eccentrics, who come out just because they shouldn't. Much of the best work in every science is done by idealists and eccentrics; but a stable department, let alone a whole medical school, needs a fair stiffening of good solid family types. (Isn't it odd though, to be irrelevant for a moment, how often people belie their social casting when it comes to the quality of their original work? Provocative ideas come from Tory clubmen with very old-school ties, meticulous techniques from long-haired musical Sephardim, destructive criticisms from family men with contented homes, flashy stuff from dour Yorkshiremen, and sound work from spiv cockneys—and wouldn't life be dull if they didn't?)

My own (partial, admittedly) answer is a massive extension of seconding. It's easy in theory, though not always in practice, to get seconded abroad from a British university for one year, possible for two, but impossible practically for more than that. It should be possible for a man appointed to a Colonial chair, or any post of public importance overseas, to be seconded from his home post for, say, six years. He could put his shoulder to your wheel then with no carking care for the future, with no half-eye, in all he did or wrote, to a distant selection board. He could come home to a job perhaps less than his desserts, but at least something he has not to scramble for. At least it will give him time to look about him. If he was worth the appointment in the first place, and if he's used his time to a good purpose since, he should be able to climb further. The difficulties of the seconding school in such a course can't of course be laughed off entirely, but I believe that with good will on both sides there's nothing insuperable. Let it be done successfully once, and it would be easy: for half the battle in such a scheme is the confidence that it's workable.

I would like to see tried an even more fancy scheme in which two men of roughly equal status are appointed together to two posts, one a Colonial chair and the other a readership at home. They would alternate between the two at say eighteen-month to two-year intervals, swapping houses and research projects, and looking after each other's children and other interests, and generally playing Cox and Box as much as possible. Thus one might get the maximum of continuity with the minimum of stagnation. The original pair—and their wives—would have to be young, tough, adaptable, and infinitely tolerant of each other's troubles: but they would have enormous fun and might well do great things. Impossible? How do you know till it's been tried?

No matter what the solution, I must confess that one root cause of your troubles is one that I'd hate to see eradicated. For all our beefing (and why not?—for love of research implies dissatisfaction with the existing order, and so all scientists are grumblers at heart) there's a lot to be said for academic medicine in this country. The University Grants Committee may walk a tight-rope, with the stifling net of Government control (or the hard cold ground of bankruptcy) to catch its least stumble; but so far it's balanced supremely skilfully and it shows no sign of falling yet. So long as it works, universities in this country remain as free of non-academic influences as any in the world. We're no plutocrats, but we're paid probably nearly as much as is good for us. The pace in research is hot but not killing, and man for man we pull our weight I think as well as any. Perhaps it won't last: perhaps we will become Civil-Service minded, and perhaps it's true we're attracting a less original kind of student and will suffer in the next generation (but haven't students always been worse than their fathers?). Myself, I like it here, and here I intend to stick.

Am I too easily satisfied? Do I sound to you like the Reverend Eli Jenkins, whose lovely lyric in Milk Wood is after all, when you boil it down, no more than sentimental parochialism? I'd rather sing to you in the words of the early Keats:

> "Happy is England! I could be content
> To see no other verdure than its own;
> To feel no other breezes than are blown
> Through its tall woods with high romances blent;
> Yet do I sometimes feel a languishment
> For skies Mingaran . . ."

But I am, as I said, and as it should by now be obvious, too old. I'm sorry, Charles. You'll soon find someone better than me.

Yours,

PETER DAVEY.

In England Now

A Running Commentary by Peripatetic Correspondents

HOWEVER long the sentence, the full stop at the end is always the same size. Alas, one cannot say the same about the last patient. His size grows with the lateness of the hour and the number that have gone before him.

At routine medical examinations the last applicant will have covered his form with illnesses which he refuses to have dismissed as minor. Nothing but a detailed inquiry into his history will satisfy him. Any sign of impatience will bring forth "Well, doctor, it does say *any other illness*, and I always say it pays to be honest." The extraordinary thing is that not only does he have a long history, but also a heart murmur, and a trace of sugar in his urine. When all is over and release is in sight, as your hand steals towards your pocket to light up another carcinogen, he turns as he goes through the door and remarks "Of course I did once have a nervous breakdown, but that's not really a disease is it?"

At the end of Outpatients the scene is different yet the same. Glancing at the notes of the last patient it seems that it will only be a case of "rep. mist." But as the patient enters with that firm, determined gait, anxiety is aroused, and as she sits down firmly, arranges her belongings around her, undoes her coat, throws back her scarf, removes her hat, and pats her hair, fear grips you. This apprehension is immediately confirmed as she opens the proceedings with "I'm afraid your medicine hasn't suited me at all. Not only is my pain still there, but I have now developed . . ."

In general practice you may meet the last patient either at the end of the round or at the end of surgery. The aura, which occurs after examination and treatment of the patient, consists of a short introductory phrase followed by the euphemistic use of a rhetorical question, thus—"Oh doctor, while you are here, would you mind looking at . . ."

Surgeons tell me that the last simple appendix always has adhesions and that the last tonsil always keeps on bleeding.

Even in the Services the syndrome can be observed. I remember one evening at about five to five, just as I was climbing into my greatcoat, the sergeant rushed into my room.

"Going off, Sir? There's just one more."

"Tell him to come to-morrow, or if it's urgent get the duty doctor."

"He insists on seeing you, Sir."

"Who the hell does he think he is—the Air Officer Commanding?"

"That's right, Sir."

* * *

I was having dinner with my aunt when she plunged her hand into her bag, extracted a letter, and passed it to me saying "I thought you might be interested." It was a note from a consultant to her G.P. "Very nice," I said, "but how did you come by this?" "Have I been naughty?" she asked. "When I went to my doctor the receptionist gave me my record envelope to take in to him, and while I was waiting I found this in it, and I thought you could explain it to me. Perhaps I *was* naughty, and now I'm rather worried in case he misses it."

My wife, who knows the answer to most questions, solved this one. "You go along to him to tell him how much better you are, and when the receptionist gives you your card, just slip the letter back, and he'll not know."

So she did, and he didn't.

* * *

The taxi-drivers of New York are an articulate and mostly intelligent race. As soon as they found that I came from this side of the Atlantic, they would open up and give me their views on diverse subjects. Mr. Chamberlain, his umbrella, and his trip to Munich came in for much adverse comment. On the other hand, Mr. Roosevelt and Mr. Eisenhower did not make a very

good showing. According to the taxi-drivers, the country went to the dogs under Roosevelt; and under Eisenhower, I gathered, the States are putting on an act rather like that of the Gadarene swine. Being in possession of a quasi-diplomatic visa, I felt it my duty to protest and point out my great admiration for the people of the United States, their potentialities, and their accomplishments. Unlike Carlyle, I was unable to hide my affection for the people of that great land. But the taxi-drivers would have none of it. "You just don't know the half of it," they said. "Look," said one, "at our juvenile delinquency!"; and he went on to explain that, in his opinion, juvenile delinquency came in with child psychology. "It was a bad day," he said, "when the principle of not thwarting or punishing was put forward. Take dogs. To train them you have to hurt them a bit. Then they remember not to do it next time." I was able to slip in quickly a remark about Pavlov and the conditioned reflex. He seized on it. "That's swell, and I'm going to use it next time I talk about juvenile delinquency." By this time we had reached Penn Station where we parted with mutual expressions of good will. I must admit that I grossly overtipped him. A kind of entertainment tax.

* * *

For the first time ever, we were the successful candidate at the interview. As we peripatetted happily back in the general direction of the Northern Kingdom, in our very first car—bought on the strength of the interview so recently and satisfactorily concluded—the Northumbrian night grew ever darker, wetter, and wilder, the oncoming lorries more and more numerous and their headlights more and more blinding. Our own grew ever feebler, and at last succumbed. We were forced to call a halt until we could continue our progress by daylight. But what a fortunate stopping-place: a few more miles in the darkness, and we should have missed the find of the year, the solution of a major medical mystery. You may find it in the literature, there for all to see. The reference is 393/639, O.S. Quarter-Inch, Sheet One (The Border), Chessington 1946—no less than the whereabouts of that ubiquitous and omnicompetent writer Etal.

* * *

Will the Back to Victoria movement now filling our bookshelves and flooding the antique shops with painted coal-scuttles, bamboo curate's joys, and red plush tablecloths with bobbles soon affect our own profession? Shall we hear, across hospital luncheon-tables . . . "so I exhibited an egg in port wine *per rectum* . . ." "through the courtesy of Dr. Shufflebotham, the family practitioner . . ." "After hearing the history and after examination of the patient, I decided he was suffering from . . ."? Puns will of course prosper, and riddles return:

Consultant; on ward round: "Riddle-me-ree!"
Houseman; eagerly: "Not *another* one, Sir?"
Consultant: "Yes, m'boy. Why is the N.H.S. like a game at lawn-tennis? You give it up? Because though you may have a good Racquet, you'll be taken to Court; and though you Love it to begin with, at Forty it may be the Deuce." (*Whereupon the Houseman is so consumed with merriment that he drops two cups and a seton and allows a leech to escape into the bed.*)

* * *

In Scotland at present many of my colleagues who are parents are behaving oddly. They have a far-away look. If asked a question they tend to reply in snatches of Shakespeare, terms of x and y, or the coefficient of expansion. Instead of knocking impatiently at the bathroom door in the morning they give precedence to the progeny. They make anxious inquiries about the condition of pens, pencils, &c. In brief the "Highers" are once more upon us.

One of my offspring, whose intellectual processes function by a kind of leapfrog mechanism, was confronted by a biology question on plant fertilisation, obviously demanding a ladylike discourse about pistils, stamens, and pollen in the appropriate setting of a sunny garden, roses in bloom, and the hum of the bee tribe. Instead she chose to write on the joys of muck spreading, and for two foolscap pages she wallowed in the rich effluvium of manure. Does she get a credit?

Letters to the Editor

HYPOTHERMIA IN THE NEWBORN: A NEW SYNDROME?

SIR,—Comparatively little has been written of the dangers of heating small premature infants, and your annotation of March 5 is most timely, especially in this age of incubators.

In 1953, at a meeting of the section of pædiatrics of the Royal Society of Medicine when the effects of environment on the premature baby were being discussed, I drew attention briefly to a refrigerated state occurring in these babies and emphasised the danger of warming such infants too quickly.[1] I mentioned that pneumonia, which had not been detected clinically, was the usual post-mortem finding. Further experience at the Royal Alexandra Hospital for Sick Children in the last two years has shown that this remarkable syndrome, although confined to the early days of life, is by no means peculiar to the premature infant; indeed the 4 examples we have seen in the last few weeks have all been in babies with a birth-weight above $5^1/_2$ lb.

I feel that it is especially important for doctors and midwives concerned with domiciliary work to be aware of this disorder.

The syndrome, as I have seen it, is almost confined to babies born at home during the winter months. Birth is usually uneventful, and the child behaves normally for a few days. Refusal to feed and increasing lethargy and coldness are the most constant presenting symptoms. On admission to hospital the infant feels cold and indeed radiates coldness; the extremities and face—particularly the eyelids—are puffy, and pitting œdema, at times gross, may be demonstrated in these places; some associated induration of the skin may be present (sclerœdema) but this is certainly not a constant feature at this stage. The baby lies motionless and respiratory movements may be difficult to discern. The most striking and constant finding (and one liable to mislead) is the unusual pinkness of the cheeks, chin, and lips, and sometimes the eyelids.

Attempts to record the baby's temperature on arrival at hospital, using an ordinary clinical thermometer, are unsuccessful. A low-reading thermometer commonly gives a rectal temperature of 80–90°F; but this figure, recorded in the admission-room and usually after some heating at home or during the ambulance journey, may be appreciably higher than that which obtained when the baby first became sick. The rectal temperature of the most recent case we have seen was 74°F; and this baby was swathed in blankets and was 3 feet from a fire, and extra heat was being provided with the help of a hot-water bottle when I saw it at home.

As far as treatment is concerned I can be quite definite about one thing: that injudicious heating leads to death in a few hours, cyanosis and sometimes convulsions being terminal features. Even the ordinary ward-temperature may be too high for nursing purposes, and we have found it necessary in the last month to open a special "cold-room" to avoid a too rapid rise of body-temperature and consequent anoxia. At the moment we keep these babies cool for their first few days in hospital, thereafter allowing their temperatures to rise slowly.

Since the most constant necropsy finding is pneumonia, usually hæmorrhagic, an antibiotic is given by way of the alimentary tract, where possible through an indwelling 'Polythene' tube. 3 of our 4 recent cases have developed profuse purulent nasal discharge within a few hours of admission, and this complication may make inadvisable the passage of a tube through the nose.

Intermittent œsophageal feeds, the tube being passed through the mouth, may then become necessary since these infants are quite unable to take food from a bottle or spoon. It has been our practice until recently to give full-strength breast-milk feeds from the time of admission; but in our most recent example of this syndrome

1. *Proc. R. Soc. Med.* 1953, **46**, 883.

complete anuria has complicated the picture and made feeding difficult. Although it seems rational to provide calories for the maintenance of body-temperature it must be remembered that most of these babies are œdematous and further water retention must not be encouraged. In our experience oxygen therapy does more harm than good. But if cyanosis appears, oxygen must of course be used.

Although post-mortem studies suggest that an underlying pneumonia is a constant accompaniment of this hypothermic syndrome, physical signs in the chest do not indicate consolidation. Added sounds over the lungs originating in the upper respiratory tract are a common finding. One of our recent cases, now recovering, had a normal chest radiograph on admission. A second radiograph forty-eight hours later showed consolidation of the right upper lobe which might have passed undiagnosed if this early repeat film had not been taken.

A more detailed report is being prepared for publication. It would be interesting to hear if others are seeing examples of this syndrome.

Royal Alexandra Hospital
for Sick Children, Brighton. TREVOR P. MANN.

SANATORIA

SIR,—Your correspondents' views seem to range from those, like Dr. Stradling (Feb. 19), who think sanatoria are outmoded to others, like Dr. Snell (March 5) if we read him aright, who think they should form the basis of tuberculosis treatment and that the general-hospital beds now used by chest-clinic physicians should be put to better uses. As chest-clinic physicians who still believe that the sanatorium has a place in the treatment of many tuberculous patients, we feel that the latter is not the whole answer. We think that sanatorium physicians take perhaps a too one-sided view. For many years they have taken the cream, as it were, of the tuberculous patients—i.e., those with a relatively good prognosis. They have been insulated from the problem of the considerable numbers of chronic advanced cases treated by the chest-clinic organisation.

Leaving aside the other uses to which the chest-clinic physicians put their general-hospital beds it is difficult to see how the sanatoria could readily deal with such cases. Many patients are elderly; they dislike going to hospital and will only do so for short periods and provided it is not too far away from home. They are subject to frequent intercurrent infections and often need all the resources of a general hospital. As a rule they are not too welcome in sanatoria, which can at most bring them only to a stage of "maximum benefit" from which they commonly relapse. The control and treatment of this army of "chronics" is a matter in which the chest clinics can at present get only a limited amount of help from the sanatoria.

GEOFFREY BEVEN
Ealing. HUGH CLIMIE.

Sir,—Your timely leading article [1] has given rise to a useful correspondence. I think it important, however, that we should clearly maintain the distinction between "sanatorium treatment"—the principles of treatment laid down these many years as the basis of sanatorium therapy—and the transference of the patient bodily from the associations of home and relations and friends to the remote geographical location designated a sanatorium. In the principles of sanatorium treatment we all believe; but over the admission of all tuberculous patients to sanatorium there is wide divergence.

In deciding whether to recommend admission to a sanatorium, we must weigh, among other factors, the value of prevention of the disease, and recognition of the patient as an individual.

1. *Lancet*, 1954, ii, 1313.

Prevention involves good housing, good food, fresh air, and good ventilation, and the removal of the infected person from close contact with healthy relatives. Some claim that prevention is best achieved by removing the patient to a sanatorium, there to enjoy "peace and quiet." But others point out that in such a selected and segregated population all the patients are likely to be equally distraught and uncertain; and claim that, given an adequate level of housing, the health visitor, chest physician, and family doctor, with the coöperation of the relatives, can successfully prevent the spread of the disease without the patient being removed from home.

Secondly, it should be remembered that man is not the flat citizen of flatland, nor entirely a "rude mechanical that works for bread." Tuberculosis is a disease of the whole body focused on one or more organs; and if we are to enable the patient to overcome the infection we must treat him as an individual. He should be placed in the best possible environment to attain "courage, gaiety and the quiet mind"; and while admission to sanatorium supplies this for some, the surroundings of home and family are the ideal setting for many more. To suggest that sanatorium provides the ideal surrounding for mental and bodily rest and that only a small psychological adjustment is necessary on return home is nonsense. The interminable discussion on phases of the disease and modes of therapy that result from enforced segregation in sanatorium produce the tuberculosis complex of living tuberculosis, thinking tuberculosis, talking tuberculosis, and even dreaming tuberculosis, while "barrack-room lawyers" commonly produce a state of mind that destroys the will to coöperate in treatment.

The treatment of tuberculosis should be a planned, combined operation. If the planning is sound, then I submit that the number of patients admitted to sanatorium will continue to decline.

Maidstone. D. L. PUGH.

MENTAL HEALTH AND SPIRITUAL VALUES

SIR,—Psychiatrists and many others must feel a debt of gratitude to Sir Geoffrey Vickers for his address, so erudite in content and felicitous in presentation. In the abridged version, which appeared last week, he raises, however (p. 524, paragraph 2), points which seem to merit comment. He writes:

"Yet a conflict is not necessarily resolved merely by being disclosed. It may not be capable of being resolved; it may simply have to be borne. Tensions are not only inescapable, but necessary and fruitful. It would certainly not be fair to say that psychiatry offers escape from them, while religion offers the strength to bear them, for each in some measure offers both; but the emphasis in psychiatry and throughout the field of mental health is on reducing rather than on supporting stress."

The reason why psychiatry favours reduction techniques is, surely, because neurotic tensions are, by and large, escapable, unnecessary, and fruitless.

Patients oft-times asseverate: "Had my religion been valid or my ethics sound, I should not have required medical assistance." Many such folk are deeply religious and morally sincere; they are in the grip of tensions they wot not of. Resolution of conflict, simply, places them in the position of the healthy; but since neurotic conflict hinders development, and is in effect always of long standing, immaturity is, in addition, present; and helping patients to grow up is the second essential of psychotherapeutic procedure. This aspect has, certainly, spiritual connotation.

The implications seem to be: neurotic conflicts differ—qualitatively—from the tensions of progressive life. If accuracy is to be achieved, psychological facts derived from psychiatry require to be subjected to criticism before being granted œcumenical status. The present is no more an age of neurotic anxiety than any other. Current conditions, however, favour the development of objective anxiety. Most people, in tension-laden communities, are, on the one hand, warm and well fed. They are, on the other hand, constantly reminded of the devastating potentialities of atomic warfare.

London, W.1. MURDO MACKENZIE.

CEREBRAL ARTERIAL DISEASE

SIR,—Your annotation of Jan. 15, commenting on our recent papers,[1] questions our conclusion that cerebral-artery aneurysms of the berry type may arise on other than a congenital basis.

Fundamental to an understanding of the pathogenesis of certain types of vascular lesions is the fact that the various components which make up the walls of arteries are capable of only a limited range of tissue response to injurious agents, so that the same lesion (sclerotic plaque or aneurysm) may develop from unrelated causes.

Intimal elements can respond by an increase in ground substance and by the proliferation of fibroblasts to produce the initial phase of plaque formation. The internal and external elastic lamellæ, which degenerate by fraying, fibrillation, fragmentation, and granulation, may respond by reduplication of existing elements or by the new formation of elastic tissue; additional support may thus be gained by the new formation of elastic fibrils in the intima and media as well as along the internal and external zones. Degenerated and destroyed muscle may be replaced by fibrous-tissue elements, and the limited response-potential is expressed only in the form of hypertrophy of spared muscle-fibres. Finally, as Winternitz, Thomas, and LeCompte [2] have shown, there may be increased vascularisation of the artery wall.

Furthermore, the tissue response of a particular artery is also limited by its initial structure. Cerebral arteries are handicapped in that they lack an external elastic lamella or have only a rudimentary one, and are thus without a protective mechanism afforded arteries elsewhere. This weakness makes them more susceptible to aneurysm formation than are other arteries of comparable size. Both Forbus [3] and Glynn [4] make the point that, despite the defect in the muscular coat, aneurysms do not form in cerebral arteries unless the internal elastic lamella is injured, and Eppinger [5] has observed that aneurysms are rare outside the cerebral circulation although muscular defects similar to those in cerebral arteries are not uncommon elsewhere.

The difference in tissue response-potential between arteries in different locations may be further illustrated by another comparison. In cerebral arteries inflammatory lesions may result in aneurysm formation as recently reported by us,[1a] although we do not contend that this is the only mechanism by which elastic tissue may be injured and an aneurysm may be formed. In coronary arteries, on the other hand, similar inflammatory lesions lead to stenosis with narrowing of the lumen as illustrated in the excellent article by Zak, Helpern, and Adlersberg.[6] Similarly as regards arteriosclerosis, the pathogenic processes which in coronary arteries produce a stenosing lesion, with eventual occlusion of the lumen, may in cerebral arteries lead to aneurysm formation or rupture—events which are very rare in coronary vessels. The criticism that in our work the arteries were not fixed in a state of distension to normal pressure is not a valid one, since without resorting to this technique we were able to demonstrate frequent bulging of plaques into the media; and in fact we explained this tendency in cerebral arteries as due to lack of the protection usually afforded by the external elastic lamella.

In light of these observations, it appears fruitless to insist that congenital defects play a primary rôle in the development of cerebral-artery aneurysms. There is even some question as to the congenital origin of muscle defects,[7] which, so far as we know, has not yet been firmly established. The occasional association of these defects with other congenital lesions may in fact be fortuitous, since the large majority of cases exhibiting them do not have other associated congenital abnormalities. More pertinently, it seems clear that greater protection is afforded by elastic elements than by muscle.

We may add that in our opinion the importance of circulating lipids in the causation of plaques has been greatly exaggerated. We recognise that primary atherosclerosis can develop on the basis of elevated serum-lipids in certain definite clinical states including familial hypercholesterolæmia, hypothyroidism, and lipoid nephrosis; but to what extent this happens under other conditions remains to be established. Our investigations are aimed among other things at determining how far the appearance of lipids in plaques is due to local degenerative processes within arterial walls.

The Jewish Hospital,
St. Louis,
Missouri, U.S.A.

HERMAN T. BLUMENTHAL
FRED P. HANDLER.

1. (*a*) Handler, F. P., Blumenthal, H. T. *J. Amer. med. Ass.* 1954, **155**, 1479. (*b*) Blumenthal, H. T., Handler, F. P., Blache, J. O. *Amer. J. Med.* 1954, **17**, 337.
2. Winternitz, M. C., Thomas, R. M., LeCompte, P. M. The Biology of Arteriosclerosis. Springfield, Ill., 1938.
3. Forbus, W. D. *Bull. Johns Hopk. Hosp.* 1930, **47**, 239.
4. Glynn, L. E. *J. Path. Bact.* 1940, **51**, 213.
5. Eppinger, H. *Arch. klin. Chir.* 1887, **35**, 1.
6. Zak, F. G., Helpern, M., Adlersberg, D. *Angiology*, 1952, **3**, 289.
7. Tuthill, C. R. *Arch. Path.* 1933, **16**, 630.

AIR EMBOLISM ASSOCIATED WITH RUPTURED UTERUS

SIR,—My interest in the article by Mr. Scrimgeour and Mr. Carrick (March 5) is related to experience of accidental air embolism during therapeutic injection of air in artificial pneumothorax and pneumoperitoneum. Additionally my wife suffered a minor air embolism some years ago after a normal delivery, and this was diagnosed at the time by the occurrence of faintness, dimness of vision, and severe pain between the scapulæ, lasting for about half an hour.

As students we were taught about "pleural shock," which is now generally acknowledged by chest physicians to be due to air embolus, and it would seem that some cases of "obstetric shock" may be due to the same cause.

The first-aid treatment of this condition, which may be life-saving, is immediate lowering of the head, even to suspension by the legs and preferably with rotation to the left side. This presumably allows the air to float away from the brain and heart to the lower part of the body, where it is gradually absorbed. Since the air must enter per vaginam it would seem reasonable to occlude the introitus with an air-tight pad after delivery of the placenta.

Colindale Hospital,
London, N.W.9.

W. E. SNELL.

INNOCUOUS TEMPORARY IMMOBILITY

SIR,—Dr. Rudolf (Jan. 1) states that 19% of 60 male and female nurses whom he questioned had had one or more attacks of night nurse's paralysis or, as he prefers to call it, "innocuous temporary immobility."

I found that of my small staff of five European nurses the four who had been trained in England all knew of the condition, and two had experienced it personally while on night-duty during training. One nurse had had it twice, the other once; and all three attacks had followed the same pattern—i.e., inability of the nurse, who had been sitting relaxed in a darkened ward, to rise from her chair on the approach of the night sister.

Is Miss Peace's disability [1] really an example of the above condition? There seem to be certain features which relate it rather to "sleep paralysis"—the relative frequency of the attacks, auditory hallucinations and the feeling of unreality which indicates a dream state on the verge of sleep.

I have under observation a middle-aged man who for some years has had attacks of "sleep paralysis."

These attacks are accompanied by anxiety and a feeling that he must force himself fully awake; and sometimes by auditory hallucinations, such as high-pitched music or the voice of an acquaintance. Once he had a strong impression that someone was at the front door; he imagined he heard his wife

1. *Lancet*, 1954, ii, 1324.

say, "That must be Mc— "; he did not catch the name but the rest of the sentence was so clear and distinct that he rejected the idea of an hallucination and thought "I really am caught in this ridiculous situation, by a stranger, this time."

It would be interesting to learn whether Miss Peace has ever had episodes of irresistible sleep, or of sudden muscular flaccidity under the influence of emotion, both of which are experienced by my own patient.

Is it too far-fetched to suggest that such brief muscular immobility in man may depend on unrealised conflicts of impulses, which in a simpler form—that of conflict between the impulse to seek safety by running away and the impulse to stay and protect the nest—underlie the "injury feigning" or "distraction displays" of birds?

RHODESIAN DOCTOR.

DISSECTING ANEURYSM OF THE AORTA

SIR,—We read with great interest the account by Professor Thomson and Dr. Marson (March 5) of two cases of rupture of aortic dissecting aneurysm causing subcutaneous hæmorrhage. We have recently seen a patient with a similar condition who survived in hospital for twenty-three days.

A labourer, aged 61, complained of sudden severe pain in the left shoulder, while engaged in his usual occupation of shovelling gravel. The pain quite rapidly subsided to a dull ache and he was able to complete his day's work. That evening, however, he noticed that a large bruise had appeared over the left side of his chest, and it was on this account that he came to hospital. On admission the patient had no other complaints and there was no history of previous illness.

On examination, his general condition was good. There was extensive subcutaneous bruising along the inferior and medial border of the left pectoralis muscle, and the whole of this muscle appeared to have been lifted forwards. The left radial pulse was weaker than the right, and both were collapsing. The femoral and carotid pulses were equal. The left external jugular vein was distended. The heart was not enlarged on clinical examination, but there was a loud aortic diastolic murmur. Radiographic examination showed a large soft-tissue swelling of the left chest wall and some broadening of the aortic shadow. An electrocardiogram was normal. There were no other abnormal findings.

The bruise, while slowly fading, spread to the flank (see accompanying figure). The patient's condition remained

Bruising of chest wall and flank.

good, but after twenty-three days, while still in hospital, he suddenly died.

At necropsy it was obvious that the immediate cause of death was hæmopericardium. In the ascending aorta there was a vertical tear, 2 cm. long, in the intima, from which a dissecting aneurysm could be traced that involved the arch of the aorta and the left subclavian artery. The point at which the aneurysm had ruptured into the tissues could not be exactly defined, although it seemed to be in one of the branches of the subclavian artery deep to the pectoralis major. Histological examination of the aorta showed the characteristic cystic necrosis of the media.

Green and Saphir [1] described the case of a woman with a ruptured dissecting aneurysm of the aorta and subcutaneous ecchymoses of the lower abdomen, who died within thirty hours from the onset of symptoms. No similar case-report has been found in the English literature.

Medical Unit, Cardiff Royal Infirmary, M. G. FITZGERALD E. J. WATSON-WILLIAMS.

ADENOTRIPHOSPHATASE IN HERPES ZOSTER

SIR,—During recent research with compounds of the phosphatase group in the treatment of herpes zoster I have found that adenotriphosphatase (10 mg. per ml. given subcutaneously at the site of the pain) has a relatively rapid soothing effect.

At each injection 1 ml. was given, and in no case were more than three injections necessary. These were given on consecutive days when the condition did not clear up rapidly, with gradual desiccation of the lesion and uneventful recovery. So far 10 cases varying from mild to severe and extensive herpes zoster have been treated by this method and all have responded rapidly.

It is improbable that adenotriphosphatase has antiviral properties. Its effects are probably due to some biochemical change with abolition of an antidromic reflex. It seems that this action is specific and not due to the introduction of a foreign protein. The adenotriphosphatase was prepared from potatoes by the usual method.

Adelaide, South Australia. MICHEL BROUS.

ENURESIS

SIR,—I must congratulate you on your leading article of Feb. 19. In particular you wisely emphasise the physical and mechanical causes, which are less frequently recognised than the psychic overlay.

Certain fundamental facts deserve to be still further stressed. Neither diminished bladder capacity nor excessive nocturnal excretion of urine can alone cause wetting. What is important is the relationship of the one to the other. Night-wetting occurs when the volume excreted at night is greater than the bladder of this particular child will hold.

This relationship may be expressed by a ratio, the "night-urine/bladder-capacity (N/B) ratio," which is defined as the mean volume excreted at night (between 8 P.M. and 8 A.M.) divided by the mean of the volumes passed in each act of micturition by day. This ratio gives the number of times the bladder is comfortably filled in an average night. In continent children the N/B ratio is not greater than 2—that is to say, the bladder will contain during sleep twice its mean diurnal capacity. In the vast majority of enuretics (80% of 350 consecutive patients) the ratio is higher than this—often as high as 4 or 5 or more.

Having established that the bladder is filled with urine several times each night, it remains to decide whether the bladder holds less than it should, or whether the night urine is excessive, or both; and then, after assigning the chief blame to one of these factors, one must try to find the cause of the abnormality. Of course the bladder capacity we are measuring is purely functional, and any residual urine is excluded from it.

It appears from my figures that the functional capacity of a normal bladder is loosely correlated with the volume of urine excreted during the day-time. Apparently the times for evacuation of the bladder are determined to some extent by outside influences—by the parents, by the school routine, by imitating companions, or sometimes by the direct orders of the teacher who insists on her younger pupils passing water at set times. The intervals between acts of micturition being thus determined, the healthy bladder develops a capacity adequate to the volumes it is called on to hold.

1. *Amer. J. med. Sci.* 1948, **216**, 24.

Thus it is found that children who excrete a normal daily output of urine, but an unduly high proportion of it at night, tend to excrete less urine than normal by day, and therefore to have a somewhat reduced bladder capacity. On the other hand, children who have an abnormally high total output both by day and by night are nearly always found to have a high functional bladder capacity. In such children nocturnal enuresis occurs only when the volume excreted exceeds the ability of the normal bladder to compensate for it by expansion: and in such children there is always diurnal frequency and/or day-wetting as well.

The following expresses very approximately the position for many children. A normal child excretes less than half as much urine in the twelve hours of the night as in the twelve hours of the day. He can, if he tries, contain his urine for half the day, and therefore he can hold it for the whole of the night. If, as the result of disease, accident, or heredity, he passes three-quarters as much urine by night as by day, he will be able to contain his urine through the night only if he can hold it for three-quarters of the day. A healthy bladder can achieve this with training. If he excretes equal volumes by day and by night, he will be able to last through the night only if he can last the whole day. Although this can sometimes be achieved by bladder training alone, in general every ancillary aid must be brought to bear on such children, including waking, restriction of fluids, drugs, and the nocturnal bell-ringing device.

Weybridge, Surrey. E. M. POULTON.

HYPERSENSITIVITY TO PRIMARY AROMATIC AMINES

SIR,—May I comment on the letter by Dr. Joseph Barnes and Dr. Elizabeth Barnes in your issue of Feb. 26.

They remark on the puzzling apparent inability of certain aromatic amines (*p*-aminobenzoic acid, sulphonamides, and procaine compounds) to produce the glandular-fever-like condition which can be caused by other primary aromatic amines.

This curious specificity is, of course, very puzzling but it is also the characteristic feature of such drug hypersensitivity reactions—for example, the reaction to aniline but not to *o*-aminobenzoic acid,[1] the reaction to acetylsalicylic acid but not to salicylic acid,[2] and the strong reaction to 1, 3-dihydroxybenzene but the weak reaction to 1, 2-dihydroxybenzene.[3] Although a primary aromatic-amine structure may be the basic structure necessary for a hypersensitivity reaction to occur, whether or not the reaction does occur and with what intensity the reaction may proceed is likely to be greatly influenced by the presence of other structures in the aromatic-amine molecule.[1] It might even be that certain additional structures would create an absolute barrier to antigenicity, possibly by blocking the molecule's protein combining power. Whether or not this is so, it seems that we may certainly expect the pattern of hypersensitive reactivity to related chemical structures to vary from patient to patient and perhaps in the same patient at different times.

It seems to me that the importance of the letter by Barnes and Barnes lies in its concept that the clinical manifestations termed "glandular fever" may represent a common end-pathway syndrome activated by an allergic mechanism.

This seems an important consideration, because it often appears to me that it is taken for granted that "glandular fever" or "infectious mononucleosis" is a precisely defined disease with an established virus ætiology. In practice, of course, many hæmatologists find its ill-defined nature most perplexing, especially when considering the motley assembly of apparently infective "glandular fevers" which appear to inhabit the realm of general practice and also the apparent vague extensions of the syndrome into other disease-entities such as the Reimann type of chronic agranulocytosis with its fluctuating lymphocytosis, monocytosis, and eosinophilia.

1. Hill, A. B. *Lancet*, 1953, i, 296.
2. Cooke, R. A. *J. Amer. med. Ass.* 1919, **73**, 759.
3. Urbach. *Arch. Derm. Syph. Wien*, 1924, **148**, 146.

In view of these difficulties, might it not be better to cease speaking of glandular fever and infectious mononucleosis as though they represented a precise disease-entity with a single specific ætiological background, and instead speak of the "glandular-fever syndrome." Although, no doubt, this would be of little immediate practical assistance, it might remind us of the probably variable basic (possibly allergen) mechanisms at play, whether they be virus (e.g., infective hepatitis), bacterial (e.g., *Erysipelothrix monocytogenes*), protozoal (e.g., toxoplasmosis) or chemical; and eventually this reminder might assist in the tidying up of this hæmatological ragbag. The idea of a mixed ætiology for glandular fever is not new,[4] but it has been sadly neglected.

King's Mill Hospital, Sutton-in-Ashfield, Notts. A. B. HILL.

CHLORPROMAZINE

SIR,—Last September we described the results of intravenous infusions of 25 mg. chlorpromazine on hand blood-flow.[5] Because considerable vasodilatation was produced after introducing 0·1 mg. adrenaline per min. into the brachial artery, it was inferred that "reversal" of the adrenaline constrictor effect had occurred.

Although subsequent studies with Dr. R. S. Duff and Dr. Jean Ginsburg have confirmed that chlorpromazine is a powerful vasodilator and has a quite definite "blocking" effect on the local constrictor action of adrenaline, it has not been possible to confirm a true adrenaline "reversal" effect on the skin vessels. It is hoped shortly to publish the results of these further experiments.

C. A. FOSTER
E. J. O'MULLANE
St. Thomas's Hospital, London, S.E.1. H. C. CHURCHILL-DAVIDSON.

VENTRICULAR FIBRILLATION IN FALLOT'S TETRALOGY

SIR,—The following case seems to merit a brief report because of two features of particular interest: firstly, the rarity of ventricular fibrillation in Fallot's tetralogy; and, secondly, the beneficial effect which appeared to follow the administration of procaine amide ('Pronestyl').

The child, aged 19 months and weighing 27 lb., had been grossly cyanosed since birth, and she was having frequent severe cyanotic attacks. There was a palpable right ventricular impulse and a blowing systolic murmur in the pulmonary area, and the second sound was single. A diagnosis of Fallot's tetralogy was supported by electrocardiography and fluoroscopy.

Cardiac catheterisation was performed under light general anæsthesia, induced with 1·4 ml. of bromethol rectally and continued with small amounts of trichoroethylene. Atropine was given as premedication. A no. 6 catheter was passed via the right median basilic vein to the right atrium and then quickly through the right ventricle (pressure 80/0 mm. Hg) into the aorta. As the tip entered the aorta the cardiac rhythm changed suddenly to ventricular fibrillation. The catheter was immediately withdrawn to the superior vena cava, and procaine amide was drawn up ready for use. After about 30 seconds the rhythm changed to ventricular tachycardia; spontaneous breathing continued but no pulses were palpable. About one minute after the onset of the arrhythmia 100 mg. of procaine amide was given down the catheter, and 30 seconds later there were five beats of supraventricular origin with an immediate return to the ventricular tachycardia. A further 50 mg. of procaine amide was then given by the same route. There was no immediate effect and the dose was to be repeated when there was a sudden reversion to normal rhythm, which was maintained. Recovery of consciousness was entirely normal. As soon as the arrhythmia occurred the anæsthetist began to give 100% oxygen.

The electrocardiogram was watched on an oscilloscope, so there is no way of accurately measuring the time intervals mentioned above. However, they were agreed upon by the

4. Schultz, W. *Klin. Wschr.* 1930, **9**, 2193.
5. Foster, C. A., O'Mullane, E. J., Gaskell, P., Churchill-Davidson, H. C. *Lancet*, 1954, ii, 614.

several observers present. It appeared that the whole period of arrhythmia did not last more than five minutes.

The diagnosis in this child was later confirmed at thoracotomy (Mr. H. R. S. Harley) and there were pulmonary infundibular and valvular stenoses. At operation bradycardia was the only arrhythmia observed.

I am not aware of ventricular fibrillation having been previously reported under catheter conditions in Fallot's tetralogy. There has been some doubt as to how useful procaine amide would be in serious ventricular arrhythmia, but, while it is impossible to be sure about cause and effect in a case like this, on two occasions there was an improvement in the rhythm following the administration of the drug. In the event of the drug being less effective it would be very difficult for a physician to decide just how early he must resort to thoracotomy and cardiac massage.

We are not keen on trichloroethylene for anæsthesia in these circumstances and much prefer to supplement the bromethol with a little intravenous pethidine only. In these small children, however, the veins do not always encourage the anæsthetist to adopt this method.

At this hospital a number of children have now been catheterised in the first weeks of life and many in the first years. This is the first untoward episode that has occurred during catheterisation, and it has been very gratifying to find how much helpful information can be gathered even in the very young.

Sully Hospital,
Penarth, Glamorgan. HUGH A. FLEMING.

SODIUM AND POTASSIUM CONCENTRATIONS IN KWASHIORKOR

SIR,—Hansen and Brock have suggested [1] that electrolyte imbalance is important in the pathogenesis of nutritional œdema of the kwashiorkor type. They reached this conclusion after observing that serum-potassium levels in infants with kwashiorkor "were significantly lower than normal on admission and rose with treatment." The serum-sodium levels of the same children could not be correlated with degree of œdema or treatment.

PLASMA CONCENTRATIONS OF SODIUM AND POTASSIUM BEFORE AND AFTER TREATMENT

Case	Before treatment			After treatment		
	Plasma-albumin (g. per 100 ml.)	Sodium (m.eq. per litre)	Potassium (m.eq. per litre)	Plasma-albumin (g. per 100 ml.)	Sodium (m.eq. per litre)	Potassium (m.eq. per litre)
1	2·0	..	..	5·0	141	4·1
2	2·4	142	3·9	..	..	..
3	1·3	142	5·0	3·9	144	4·4
4	1·9	143	4·3	..	142	2·7
5	2·3	..	..	3·8	146	4·4
6	2·2	137	4·8	2·1	142	4·2
7	1·1	139	4·8	..	..	..
8	1·6	149	4·7	5·1	140	4·4
9	0·9	140	3·7	2·0	140	4·9

In view of this report it may be of interest to record the serum-potassium and serum-sodium levels in a small series of children with kwashiorkor before and after treatment with high-protein diet. The investigations were made at the Mulago Hospital, Kampala, Uganda.

Methods.—Blood was obtained by puncture of the internal jugular vein, and was heparinised. Sodium and potassium were estimated with an internal standard flame photometer. Plasma-albumin was determined by the biuret method.

The table shows that the mean plasma-potassium concentration in seven children with severe œdema was 4·5 ± 0·1 (standard error) m.eq. per litre The mean value after treatment, when the plasma-albumin had risen from 1·7 ± 0·1 to 3·4 ± 0·7 g. per 100 ml. and the infants had lost all or most of the visible œdema, was 4·2 ± 0·1 m.eq. per litre. The mean plasma-sodium concentration on admission was 141·7 ± 1·6 and after treatment 142·1 ± 1·3 m.eq. per litre. We are unable to give potassium and sodium values for "normal" infants in Uganda since any child admitted to Mulago Hospital is likely to have been living on a protein-deficient diet.

Our results suggest that hypokalæmia is not an intrinsic feature of kwashiorkor. A possible explanation of the difference between our findings and those of Hansen and Brock is that the infants whom we investigated had either no diarrhœa or diarrhœa which was very mild. Perhaps the diarrhœa present in Hansen and Brock's patients was sufficiently severe to produce the potassium depletion which they found.[2,3]

We should like to thank Mr. K. E. Blackmore and Sister Joan Greaves for technical assistance. We are indebted to the Colonial Medical Research Committee for financial support.

Department of Pharmacology,
University of Bristol. H. HELLER
H. SCHNIEDEN.

A LIVER POISON WITH UNUSUAL PROPERTIES

SIR,—In going through literature on porphyrins I found a very interesting paper about jaundice, a paper which seems to me to open new ways for the experimental study of jaundice and bile secretion.

In 1936, in a paper [4] on the disease geeldikkop in South African sheep, Quin presented some remarkable observations on the action of alcoholic extracts of the plant *Lippia rehmanni* (Pears) on the liver and bile secretion in sheep.

Quin gave alcoholic extract of about 500 g. of lippia to 7 healthy young Merino sheep with bile fistula and a fairly constant bile secretion amounting to about 150 ml. of dark-green bile per 24 hours. During the following 24 hours the bile was remarkably reduced in volume and its colour strikingly changed. After 24 hours it was clear sea-green and after 27 hours it was colourless. The 24-hour output was reduced to about 40 ml. During the third day the bile began to regain colour, and after 8 or 9 days its colour was normal again. Simultaneously jaundice of great intensity developed; the serum was definitely yellow after 24 hours, and deep brownish yellow after 48 hours; on the third day clinical jaundice was marked.

The most remarkable feature of this poisoning, however, was that the liver showed no pathological alterations of importance, even on microscopical examination. No obstruction of the bile-ducts was found. There were no signs of hæmolysis; the Hb level and red-cell count were stable and no hæmoglobin was found in the plasma.

This seems to be a poison which is capable of producing severe jaundice without hepatocellular damage or obstruction of the bile passages, and which gives rise to secretion of white bile. And its actions are largely "functional" and reversible.

It is surprising that the action of this poison has not yet been used experimentally—e.g., in dogs or rats. There are many problems in the physiology and pathology of bile secretion and jaundice (summarised in a recent monograph [5]) which could be studied in this way.

I want to point out specially that Quin's findings seem to support the hypothesis of lymphogenous jaundice due to secretion from the blood via the liver cells to the lymph instead of to the bile.[6] It would be a very easy and elegant explanation of the action of lippia to say that it simply reversed the secretion from the bile to the lymph.

1. Hansen, J. D. L., Brock, J. F. *Lancet*, 1954, ii, 477; Brock, J. F. Proceedings of 3rd International Congress of Nutrition. Amsterdam, 1954.
2. Gamble, J. L. Chemical Anatomy, Physiology and Pathology of Extracellular Fluid. Cambridge, Mass., 1947.
3. Newburgh, L. H. Significance of the Body Fluid in Clinical Medicine. Springfield, Ill., 1950.
4. Quin, J. I. *Onderstepoort J. vet. Sci.* 1936, **7**, 351.
5. With, T. K. Biology of Bile Pigments. Copenhagen, 1954.
6. With, T. K. *Acta med. scand.* 1947, **128**, 25; *Ibid*, 1949, suppl. no. 234, p. 331. See also Liver Disease: Ciba Foundation Symposium. London, 1951; p. 202.

Further, the action of lippia is a strong argument against the hypothesis that the direct diazo reaction (Hijmans van den Bergh's direct reaction) is peculiar to bilirubin which has passed the liver cells. For the jaundiced plasma in the lippia-poisoned sheep gave a strong direct diazo reaction although it did not pass into the bile.

County Hospital,
Svendborg, Denmark. TORBEN K. WITH.

MEDIAN-NERVE PALSY FOLLOWING BEE-STINGS

SIR,—The report of Mr. Bailey and Mr. Bolton Carter (March 12) on two cases of median-nerve palsy complicating hand infections reminded me of a personal experience of median-nerve palsy resulting from bee-stings.

Last summer, when manipulating a vicious stock of bees, I was stung badly on the front of both wrists—parts of the body singularly attractive to bees. The attack was concentrated and localised. There were few stings on the fingers (because they were smeared with dimethyl phthalate) and none above the wrists (I was wearing elastic cuffs). There was little visible swelling, but I was kept awake that night by intense tingling in the thumb and in the index and middle fingers. Next day the fingers were flexed and any attempt to straighten them, actively or passively, was very painful. The little finger was normal. About 48 hours later, while I was still wondering what had happened, the symptoms began to subside rapidly.

I looked upon it as an acute carpal-tunnel syndrome, and the cases reported last week support the idea that the median nerve was involved in deep-seated œdema resulting from the stings.

Chase Farm Hospital,
Enfield, Middlesex. C. ALLAN BIRCH.

INFECTION WITH CRYPTOCOCCUS NEOFORMANS

SIR,—The report last week of two cases of cryptococcosis by Dr. Beck and his colleagues raises interesting problems.

They state that case 1 was originally diagnosed as Hodgkin's disease by cervical lymph-node biopsy, but that the development of a terminal cryptococcal meningitis "revealed the true nature of the disease." They thus imply that the Hodgkin's lesions arose as a result of cryptococcal infection. Yet the lesions described were typical of Hodgkin's disease in their microscopical appearance and showed no cryptococci, while the histology of the meningitis, where cryptococci were abundant, was that of chronic inflammation. It is difficult to accept that an organism can produce an inflammatory condition of the meninges at the same time as a Hodgkin's-like picture elsewhere. It would seem more likely that this infection arose as a terminal event in the course of typical Hodgkin's disease. This view is supported by the fact that the lymph-node enlargement preceded the cryptococcal meningitis clinically, and at necropsy the Hodgkin's lesions were extensive, while the meningeal inflammatory infiltrate was sparse.

The explanation for the association between these two diseases may be connected with the breakdown of certain immunity mechanisms that is known to occur in Hodgkin's disease. It was discovered many years ago that the proportion of tuberculin-positive reactors is much lower in Hodgkin's disease than in the general population [1]; and Dubin [2] has shown that the incidence of Wasserman-positivity in Negro patients with Hodgkin's disease is significantly lower than in the Negro population in general. It is possible that natural antibodies giving resistance to cryptococcal infection in healthy people are absent or reduced in cases of Hodgkin's disease.

Both the patients described by Dr. Beck and his colleagues had heavy doses of antibiotics. Direct stimulation of fungal growth by antibiotics has been shown to take place in the case of *Monilia albicans*,[3] but so far no work has been published in this connection with regard to torulosis.

Case 1 was given intrathecal penicillin and streptomycin as well as these antibiotics systemically and sulphonamides orally. The patient's condition deteriorated rapidly, and he died after a week of this treatment.

Eighteen months ago I saw in this hospital a case in which the cryptococcosis presented as a terminal septicæmia, with no focal lesions, in a patient with advanced Hodgkin's disease.[4] The patient had been treated with large quantities of sulphonamides, penicillin, streptomycin, and chloramphenicol during the three months before death. Here too it was possible that stimulation of cryptococcal growth by these antibiotics might have been the cause of the unusually acute infection.

May I therefore suggest that until exact knowledge is obtained on this point it would be as well to withhold local and systemic antibiotics in the treatment of torulosis, unless laboratory tests have shown that the cryptococcus is sensitive to any particular antibiotic.

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Manchester. L. MICHAELS
Registrar in Pathology.

B.C.G. VACCINATION

SIR,—Dr. Webster (March 5) hits the nail on the head when he says that "the fundamental question to which we do not know the answer is whether a positive skin reaction is really very important in immunity to tuberculosis."

A positive skin reaction is a measure of hypersensitivity and not of immunity, though of course immunity and hypersensitivity may be related. Brownlee [5] has emphasised that the characteristic widespread tissue destruction of tuberculosis follows the conditioned hypersensitivity. Hypersensitivity without immunity is clearly undesirable.

We know that a negative skin reaction can often be converted into a positive one by infection with tubercle bacilli, B.C.G., or other related organisms. We also know that a positive reactor can be converted into a negative one by desensitisation with either old tuberculin or purified protein derivative. But we do not know whether there is any difference between the negative reactor who has never been positive and the negative reactor who went through a positive phase and became negative as a result of therapeutic or natural desensitisation. If we accept Godlowski's [6] enzymatic concept of allergy, the distinction between these two types of negative reactor is clear-cut. The negative reactor who has never been through a positive phase has tissues which are insensitive to the particular antigen of the tubercle bacillus which causes hypersensitivity. The negative reactor who has been positive and has become negative through desensitisation produces sufficient antibody to destroy the antigen before it can reach the interior of the sensitised cells.

Godlowski's hypothesis also explains why in some cases of sarcoidosis the reaction cannot be converted from negative to positive with B.C.G. Such patients are negative reactors because they have been desensitised naturally, and although their tissues are still sensitive to antigen they do not exhibit hypersensitivity because the antigen is neutralised by antibody before it can do its destructive work.

Professor Heaf (Feb. 12) points out that the evidence is that B.C.G. vaccination does offer considerable protection against the development of primary tuberculosis but exerts little control over the development of postprimary lesions. Whether primary or postprimary tuberculosis is the more lethal or crippling disease in this age of chemotherapy is undecided. But the wisdom of protecting the population against primary tuberculosis and leaving it susceptible to postprimary tuberculosis is doubtful. As Professor Heaf so rightly says, "Perhaps the greatest disadvantage associated with B.C.G. vaccination is the unwarranted confidence that it has inspired in laymen in many countries."

It would seem that what is required is a vaccine which will confer immunity and will at the same time desensitise the patient. When we are satisfied that B.C.G. does confer some degree of immunity, subsequent desensitisa-

1. Reed, D. M. *Johns Hopk. Hosp. Rep.* 1902, **10**, 133.
2. Dubin, I. M. *Ann. intern. Med.* 1947, **27**, 898.
3. Foley, C. C., Winter, W. O. *J. infect. Dis.* 1949, **85**, 268.
4. Levene, M., Michaels, L. *J. clin. Path.* (in the press).
5. Brownlee, G. *Irish J. med. Sci.* October, 1951, p. 495.
6. Godlowski, Z. Z. Enzymatic Concept of Anaphylaxis and Allergy. Edinburgh, 1953.

tion could be secured with old tuberculin ; but at present this is clearly not practical on a large scale.

We can measure hypersensitivity by the skin reaction in a single human being, but we have as yet no ethical method of measuring individual immunity ; consequently we have to rely on cumbersome statistical estimates of immunity, and we should therefore not confuse ourselves by thinking that immunity and hypersensitivity must have something in common.

Flimwell, Wadhurst,
Sussex. G. E. LOXTON.

TUBERCULOSIS IN IMMIGRANTS

SIR,—In his letter of Jan. 29 Dr. James says that " in populations with high tuberculosis death-rates there is always a high proportion of positive reactors, and a high reactor-rate in children is always associated with a high death-rate in young adults." The data as found in Lewis do not bear this out.

In Lewis there is the town of Stornoway (population 4817) and four rural parishes—Stornoway (7842), Barvas (5019), Lochs (3111), and Uig (2716). The villages comprising the parish of Stornoway are situated on either side of Broad Bay at distances of from $2^1/_2$ to 14 miles, while all the other parish villages are at least 12 to 35 miles from the town. The more remote the lower the positive reactor-rate but the higher the death-rate (see accompanying table).

TUBERCULOSIS IN LEWIS

—	Stornoway burgh	Stornoway parish	Barvas parish	Lochs parish	Uig parish
Population	4817	7842	5019	3111	2716
% positive in 1949 ..	24	24	18	11	12
5–6 year (entrants) 1954	4·5	6·9	..	2·2	..
% positive in 1949 ..	50	25	20	20	15
5–12 year 1954 ..	25	17	10	11	7
Tuberculosis deaths :					
1945–50	23	79	33	27	23
1949–54	12	33	19	17	10
Sputum-positive cases (1945–54)	29(a) 16(d) 45(t)	82(a) 30(d) 112(t)	36(a) 14(d) 50(t)	18(a) 11(d) 29(t)	16(a) 4(d) 20(t)

a = alive, d = dead, t = total.

The 5–12 age-group was chosen for comparative purposes, because after the age of 12 the country children come to the Nicolson Institute in the burgh of Stornoway.

Stornoway, Lewis. R. STEVENSON DOIG.

CHEMOTHERAPY OF LEPROSY

SIR,—My experience in Northern Rhodesia prompts me to endorse Dr. Jopling's remarks (Jan. 8). In 1951 I saw something of Dr. Lowe's outstanding work in Eastern Nigeria and was greatly impressed, but results of treatment here in Rhodesia have not been equal to Dr. Lowe's.

Since 1950 some 1006 patients here have had sulphone treatment, and while results on the whole are good there is a " hard core " of cases which show little response. It is difficult to assess results accurately in terms of statistics, as conditions here are primitive and patients frequently abscond during treatment ; but of the initial group of 52 patients we started on diaminodiphenylsulphone (D.D.S.) in 1950, 5, all with severe lepromas, have died, while 20 are still here under our care. For five years these 20 patients have been under close medical supervision and on continuous D.D.S., and 7 of them still show masses of bacilli in their smears with no material change in their clinical condition.

10 lepromatous patients that showed a few bacilli in smears in 1950 have now become persistently negative and the disease appears to be arrested. 3 patients were tuberculoid cases, bacteriologically negative when treatment was commenced.

These results do not encourage complacency. Much leprosy is self-limiting and it is the " hard core " of resistant and contagious cases we must attack if the disease is to be wiped out. It will be a pity if the mass use of sulphones diverts attention from the need for more effective remedies.

Chitokoloki Leprosy Settlement,
Balovale,
Northern Rhodesia. J. T. WORSFOLD.

ADRENALECTOMY FOR HYPERTENSION

SIR,—This title of your leading article on Jan. 8, the statement in it that " hypertension is not associated with increased secretion of . . ." and the quotation from Jeffers et al.—" This is an experimental approach which cannot at present be recommended as a treatment for hypertension "—all suggest that hypertension is an entity which will respond to a single therapeutic procedure.

This attitude is anachronistic. It is a " fossil fancy of a bygone age " when clinicians believed that a single mechanism was responsible for the elevation of the blood-pressure. Today we know that hypertension may be brought about by six or seven distinct mechanisms, each of which must be dealt with differently. To refer to the treatment of hypertension in this way is as unjustifiable as to talk about the treatment of pyrexia or of an increased erythrocyte-sedimentation rate.

We are all guilty of this solecism, and one reason may be our realisation that the majority of cases of hypertension fall into the group labelled " essential," where it is likely that a single mechanism is responsible for the increase of the blood-pressure.

I presume that this thought lay behind your confident assertion : " There is now good evidence that, except in phæochromocytoma, hypertension is not associated with increased secretion of adrenaline or noradrenaline, and it is the adrenal cortex that plays the more important part in pathogenesis." I find it difficult to accept this view, for I believe that the adrenal cortex has little or nothing to do with the pathogenesis of essential hypertension. On the other hand, I regard the evidence in favour of noradrenaline as particularly strong.[1] Here I would only emphasise that the fall in blood-pressure which follows destruction and blocking of the sympathetic pathways is best explained by these procedures interfering with the production and/or the secretion of noradrenaline.

That the adrenal cortex plays little or no part in the pathogenesis of essential hypertension is indicated by these facts :

1. Cushing's syndrome (adrenal cortical hyperplasia, adrenal cortical adenoma) is rare.
2. Essential hypertension is common.
3. The stigmata of Cushing's syndrome are not found in essential hypertension.
4. The cause of the hypertension in Cushing's syndrome is almost certainly plethora induced by sodium retention.
5. Sodium retention is not a feature of uncomplicated essential hypertension.
6. Goldzicher[2] states : " Injection of cortical extracts, although raising the blood pressure in adrenal insufficiency, does not alter the blood pressure in normal controls. There is no reason to believe that cortical hormone is directly responsible for an increase in the arterial tonus, for the re-establishment of the normal blood volume explains the reaction of the adrenalectomised animal."
7. McMichael[3] states : " efforts to demonstrate increased excretion of suprarenal cortical substances in the urine of hypertensives " [presumably essential hypertensives] " have not yet succeeded."

Goldblatt's observation that hypertension induced experimentally by constriction of one renal artery could be abolished by adrenalectomy has little bearing on the solution of our problem. All it proves is that hypertension produced by one mechanism (renal hypertension) can

1. Menot, P. *Lancet*, 1954, ii, 996 ; *Ibid*, Jan. 22, 1955, p. 204.
2. Goldzicher, M. A. The Endocrine Glands. New York, 1939.
3. McMichael, J. *Brit. med. J.* 1952, i, 933.

be neutralised by hypotension induced by another (in fact by two others—namely, the mechanisms responsible for the sodium depletion and noradrenaline deficiency).

The fact that hypertension following bilateral nephrectomy is abolished by bilateral adrenalectomy can be explained in much the same way, but whether such findings demand an explanation is open to doubt. The physiological insult in these experiments is so great that one wonders whether the results might not admit of more than one interpretation. For example, the mechanism responsible for reniprival hypertension might well be quite different from that behind renal hypertension, in which event conclusions based on the identity of the two mechanisms would be invalid.

Johannesburg. PERICLES MENOF.

AFTER THE ACCIDENT

SIR,—May I support Mr. Gissane's timely remarks last week and his emphasis on the need for better organisation and facilities for the treatment of the injured. If there existed sufficient adequately staffed and equipped accident services to deal efficiently and quickly with the constant stream of accidents of all kinds, they would not only reduce the enormous cost of these accidents to the nation, but would provide the pool of staff of all grades accustomed to dealing with the injured, which is the only sound foundation on which to base plans for dealing with major accidents.

The treatment of the injured makes heavy and continuous demands on all concerned, and gives satisfaction only when it is carried out under proper conditions. This applies both to patients and to staff. In planning, equipping, and staffing accident services both these factors should be taken into account. A strong stimulus to the maintenance of a highly skilled staff in this important field would be the opportunity for them to give a prompt and complete service to all the patients. We are fortunate in Oxford in having an accident service planned on this basis, though the needs have already to some extent outstripped the provisions made for them.

J. C. SCOTT
Director, Accident Service,
United Oxford Hospitals.

FEAR AND APPENDICITIS

SIR,—Doctors in general practice in Nairobi very seldom see cases of appendicitis among the Negro population. My father, who practised in Nairobi for over fifty years, saw less than half a dozen cases in that time. In my own practice, which is of considerable size, I saw no cases at all for eight years; then in 1953 I had 4 within a few weeks. The Mau-Mau terror was then at its height, and all 4 patients were living under great strain, anxiety, and fear.

CASE 1.—A Negro woman of 22 was married to a European. The couple were well known, and the husband was in bad odour with the government because of his politics. Life was hard and precarious. The woman was brought to me complaining of pain in the right iliac fossa. She was very distressed, and said that the Mau-Mau were threatening her life because she was married to a European. Her temperature was 100·5°F. She was tender in the right iliac fossa, particularly over McBurney's point. No other focus of infection was found, and there was nothing relevant to appendicitis in her previous history. She refused to go to hospital, so I treated her with penicillin and streptomycin by injection, and aureomycin by mouth. She made a rapid and uneventful recovery.

CASE 2.—A Negro woman, married to a European farmer whose life had been threatened by the terrorists, complained of intense pain in the right iliac fossa. She had vomited several times. Her temperature was 99·7°F, and she was very tender in the right iliac fossa, with pain radiating to the right leg. There was nothing relevant in her history, and no other focus of infection was found. She refused to go to hospital, and so was treated conservatively in the same way as case 1. She recovered from this attack within a fortnight; later, when her symptoms returned, appendicectomy was successfully performed.

CASE 3.—A Negro woman, the wife of a government-employed Negro whose life had been threatened by the terrorists, complained of pain in the right iliac fossa of one month's duration. She looked thin and ill. Her temperature was normal but a lump the size of a hen's egg was palpable in the right iliac fossa. There was no other focus of infection, and there was nothing relevant in her history. She was persuaded to go to hospital, where she was operated upon, and made an uneventful recovery.

CASE 4.—A Negro woman living with a European farmer complained of intense pain in the right iliac fossa since the previous day. Three attempts had been made on the life of her husband, and there had been much theft and attempted arson on the farm, as well as malicious damage. The woman was intensely harassed by these events, and afraid for the safety of her husband and children. She was extremely tender in the right iliac fossa. Her temperature was 101·2°F. She was tender on pelvic examination, and flexing the right leg caused pain. She refused operation, so I treated her conservatively, and she recovered in twenty days. Subsequently her symptoms returned, and this time she agreed to operation, which proved successful.

In none of these cases was any focus of infection discovered. All 4 patients were taking their normal African diet. Extreme anxiety, worry, and fear were present in all, and I believe they precipitated the illness. That anxiety, worry, and fear may contribute to appendicitis has been debated for many years. I saw a few cases in England, during the late war, in which mental factors were considered to be of importance.

Nairobi, Kenya. AYRES L. RIBEIRO.

HOSPITAL STAFFS

SIR,—In view of the severely restricted number of consultant vacancies which are likely to arise, and to give senior registrars a more reasonable prospect of established posts with corresponding security of tenure, may I suggest the following:

1. That an additional grade of senior registrar (E) be introduced, this new grade to have a maximum salary of £200 more than the existing grade and to be regarded as holding established posts with permanent status.
2. That boards of governors and regional boards be empowered to confer (E) status on selected senior registrars, selection being based on recommendations from consultants at a yearly review of senior registrars.
3. That boards be authorised to increase their existing establishments of senior registrars by an additional number of senior registrars (E), these additional posts to be at the disposal of boards for duties throughout the region. The number of additional posts should be related to the total absences by way of annual leave, sickness, &c., during the twelve months prior to the yearly review.

I feel that such action would enable something to be done for the really worthy senior registrar. More important, it would give them and their families the security which they have a right to expect after many years in junior appointments.

Whittington Hospital,
Archway Wing, London, N.19. D. J. MCCARTHY
Hospital Secretary.

ARTIFICIAL HIBERNATION IN POLIOMYELITIS

SIR,—Dr. Ritchie Russell (Feb. 26) strongly opposes the use of artificial hibernation in the acute stage of poliomyelitis. Dr. Russell states that "this is not a situation in which experiments on patients with new drugs is justifiable." We agree that all possible work on animals should be completed before new methods are tested on man. But in the case of artificial hibernation a great number of experiments have been made, and furthermore the method has been subjected to clinical trials for more than three years in several neurological diseases—for instance, meningitis, encephalitis, epilepsy, and tetanus.

In the case we described (Feb. 19, p. 409) we found a desperate situation which could not be dealt with by conservative means. This case is to be reported in detail in the near future. We still think that in such circumstances it is justifiable to use a new method which is believed to be reasonably safe.

Allmänna Sjukhuset, Malmö, Sweden.

KNUT HAEGER
GUNNAR MIÖRNER.

MONGOLISM IN AFRICANS

SIR,—There appears to be a widespread feeling amongst psychiatrists—e.g., Carothers, Tooth, and Tredgold—that mongolism does not occur among Africans. We were therefore interested to read the letter in your issue of Oct. 23 by Dr. Jelliffe, stating that he did not meet a single case in his long experience of pædiatrics in Nigeria. He adds his view that mongolism among Negroes in America is due to the admixture of Caucasian strains.

His letter prompts us to mention our experience in Kampala, Uganda, where within the last three months we have seen six undoubted cases of mongolism among the local indigenous tribes (Baganda and Lango), where the possibility of any admixture of non-Negro strains can be discounted. We hope to describe these cases more fully in the near future.

Mulago Hospital, Kampala, Uganda.

J. LUDER
L. K. MUSOKE.

A NON-PULSATILE AORTIC ANEURYSM

SIR,—It is usually accepted that aortic aneurysm can be diagnosed on combined clinical and radiographic examination. The following case, however, was sufficiently atypical to constitute a real diagnostic problem.

An unmarried woman of 55 was admitted to this hospital with nine months' history, dating from a right-sided pleurisy, of dragging pain in the right loin, radiating to the right shoulder, lumbar spine, mid-abdomen, and groin. At first the pain was intermittent, but latterly it became continuous, even when she lay down; and sudden movement made it worse. The pain was not related to meals, but she had lost about two stone in weight and complained of mild dysphagia. There was some frequency of micturition, but no dysuria. She denied any significant previous illness.

Apart from moderate hypertension (172/92 mm. Hg) and mild anæmia, the only definite abnormality found on routine clinical examination was a palpable right kidney. Examination of the central nervous system was quite negative.

Intravenous pyelography was negative, but X-ray examination of the chest showed generalised cardiac enlargement with a large soft-tissue paravertebral shadow, not sharply demarcated, in the mid-thoracic area; there was erosion of the bodies of the eighth and ninth thoracic vertebræ, but no diminution of the disc spaces. Barium swallow showed the œsophagus to be partially compressed, just above the tracheal bifurcation. Tomography revealed a "glandular mass" in the posterior mediastinum; and careful X-ray screening showed no expansile or transmitted pulsation in this mass.

Blood Wassermann and Kahn tests were reported as negative. The plasma-protein ratio was just inverted, and blood-films showed a mature polymorph leucocytosis (11,000 to 16,000 per c.mm.). The erythrocyte-sedimentation rate varied between 45 and 55 mm. in the first hour. Sternal marrow showed slight eosinophilia, but no evidence of myelomatosis. There were no enlarged superficial lymph-nodes available for biposy.

A tentative diagnosis of spinal tuberculosis with a paravertebral abscess was made after further consideration of the X-ray appearances, although admittedly these were not typical. A Mantoux test (1 in 1000) was positive, but no tubercle bacilli were found on smear or subsequent culture of three gastric aspirates. There was no evidence of wasting, either before or during her stay in hospital.

Six weeks after admission the patient suddenly vomited two pints of bright red blood. Following sedation, a three-pint blood-transfusion and continuous intravenous fluids were given, and during the next few days she improved sufficiently to begin small feeds. However, on the eighth day she had a further massive hæmatemesis, and died within a few minutes.

Necropsy revealed a large fusiform aneurysm of the descending thoracic aorta, with a fistula between the sac and the œsophagus, about one inch in diameter. The sac was thickly lined with laminated thrombus. Sections of the aortic wall at various levels showed changes characteristic of syphilitic mesaortitis, still in an active phase. The aneurysm had eroded deeply into the bodies of the eighth and ninth thoracic vertebræ. Both kidneys were unduly mobile and a small retention cyst was found in the right kidney. Specimen of blood taken at necropsy again gave a negative W.R.

It is difficult to see what measure (short of thoracotomy) would have led to a correct ante-mortem diagnosis. The first hæmatemesis occurred twenty-four hours before proposed œsophagoscopy, which would probably have been fatal in itself. The absence of wasting was evidence, not fully appreciated, against a reticulosis, chronic tuberculosis, or pyogenic disease. The negative W.R. might have been viewed with more suspicion had we known before the patient's death of her three children by different fathers.

The recovery from her first hæmatemesis was strongly against its being the result of an aneurysm: a sudden aneurysmal rupture is usually fatal within minutes—as on the second occasion. But at necropsy no other healed aneurysmal rupture, œsophageal varices, or primary gastric lesion was found, and the second rupture was almost certainly at the same site as the first. Partially organised intra-aneurysmal thrombosis may have sealed the gap temporarily, in the patient's suddenly hypotensive state; and this may also have been the explanation of the atypical radiological findings.

I wish to thank Dr. J. W. Buchanan, consultant physician to the East Fife Group of Hospitals, for permission to publish this case and for his advice and criticism; Dr. Peter Aitken for permission to use the radiological reports; Dr. L. Grant Leitch for the necropsy details; and the other consultants who advised on this case for their help.

Victoria Hospital, Kirkcaldy, Fife.

GILBERT R. BRACKENRIDGE.

A BARBITURATE ANTAGONIST

SIR,—Following Dr. Harris's account (Jan. 22) of the action of β,β-methyl-ethyl-glutarimide (NP 13) we report what we believe to be the first recorded instance in Britain of this drug's employment against severe barbiturate poisoning.

The patient, a man aged 25, had taken gr. 39 each of quinalbarbitone and amylobarbitone in a combined preparation at 2.50 P.M. on Feb. 27. He had been drinking heavily the previous day. On arrival at Whittington Hospital at 6 P.M. he was in deep coma. His respiratory rate was 16 per minute; and there was generalised depression of all reflexes, with complete absence of pupillary, corneal, knee, and plantar reflexes. After conventional treatment the light reflex returned by 11 P.M., but serious deterioration set in at 3·45 A.M. on the following day with the development of right basal pneumonia.

Through the kindness of Dr. A. E. Alcock, of Nicholas Products Laboratories Ltd., we obtained a supply of NP 13 together with 2-4-diamino-5-phenylthiazole ('Daptazole'), and the combined treatment as suggested by Prof. F. H. Shaw was started at 2.15 P.M. on Feb. 28, nearly twenty-four hours after the barbiturates had been taken. The initial dosage was daptazole 15 mg. and NP 13 50 mg. given at three-minute intervals into the delivery tube of an intravenous set containing tetracycline.

At the beginning of treatment the corneal, knee, and plantar reflexes were still absent. The pulse-rate was 112 and respiration-rate 30 per minute. After thirty minutes the knee-jerks returned and respirations became deeper, and fifteen minutes later a normal plantar reflex appeared. At the end of two hours all tendon-reflexes and a weak cough-reflex were present, but the patient was still considered to be in danger. Fresh supplies of the drugs were obtained; and as there appeared to be no risk of overdosage, double quantities were given at the same time-intervals from 7.30 P.M. After two injections a withdrawal reflex was obtained, the patient coughed strongly, and the corneal reflex returned. Three further double injections were given, making a total of NP 13 2 g. and daptazole 600 mg. An uneventful recovery followed.

Two conclusions may be permissible from this single case. First, this combination of drugs is effective in

severe barbiturate poisoning; and secondly, the intermittent method of administration provides a wide margin of safety.

Whittington Hospital, Highgate Wing, London, N.19. E. MONTUSCHI P. D. WICKENDEN.

HORROR COMICS

SIR,—May I express my appreciation of your leading article of March 5. Your enlightened and comprehensive statement is in contrast to what has happened in the United States.

Here not one single medical journal has taken up this scientific problem, and not one psychiatric journal has as much as mentioned the public-health aspect. As a matter of fact, one of the crime-comic-book publishers was permitted by a popular medical journal to justify his poison in an article In Defence of Comic Books—which is like permitting a distiller to write In Defence of Alcoholism.

You deserve the gratitude of parents for having treated the comic-book problem as a public-health problem. Public health, as William Welch, Sudhoff, and Henry Sigerist often pointed out, is international. And just as the current debate in the British House of Commons could well be a model for the United States Congress, which has now twice brushed off the comic-book problem, so *The Lancet* may well be a preceptor for our American medical journals.

New York. FREDRIC WERTHAM.

COSMETICS

Mr. Ralph G. Harry, F.R.I.C., writes:

I am at present revising my book, *Cosmetic Materials*, and am anxious to obtain as much information as possible about primary irritation or sensitisation arising from substances used in the cosmetic, toilet, and pharmaceutical industries. I should be very glad to receive brief details of instances in which the offending ingredients have been definitely confirmed by skin tests. If any of your readers would be good enough to supply such details, I should be very grateful if they would write to me at 60, Broad Walk, Heston, Middlesex.

Medicine and the Law

Broken Needle in Child's Throat

A CHILD of 10 was undergoing tonsillectomy and adenoidectomy when the right tonsillar bed began to bleed severely. While the surgeon was attempting to control the bleeding by stitching the anterior and posterior faucial pillars together, the needle broke, and two-thirds of it (about $^1/_2$ in.) remained in the child's throat. A stitch was inserted with a fresh needle, and the bleeding brought under control. At that point the bulb in the surgeon's headlamp failed, plunging the theatre into darkness. The bulb was quickly replaced, and the surgeon began a search for the broken needle which continued unsuccessfully for an hour. The needle was later removed in another hospital by means of an electromagnet.

Subsequently the child's father, on his daughter's behalf, claimed £5000 damages from the surgeon. Giving judgment in the Edinburgh Court of Session on March 4, Lord Guthrie said that examination by a specialist revealed heavy scarring and immobility of the soft palate. Despite speech therapy the girl's speech was difficult to understand. It was possible that this might improve, but her voice would not be adequate for singing. He held that if the surgeon had exercised reasonable care and skill he would have desisted from his blind search. It should have occurred to him that prolonged probing and stretching of the fibres would have serious and possibly permanent consequences. £850 damages were awarded against the surgeon.[1]

1. *Times*, March 5, 1955; *Glasgow Herald*, March 5, 1955.

Parliament

QUESTION TIME

Diagnosis of Pneumoconiosis

Replying to a question, Mr. OSBERT PEAKE, Minister of Pensions and National Insurance, said that he did not think an inquiry into the causes of the wide variation in the proportion of pneumoconiosis claims diagnosed as such by the pneumoconiosis medical panels in the different areas would serve any useful purpose.

Mr. W. N. WARBEY: Is the Minister aware that the wide variation in diagnosis, from as high as 78% in Scotland and 70% in the West Midlands to as low as 47% in the East Midlands, is causing a great deal of uneasiness in the coal-mining industry? Now that the scheme has been working for some years, does the Minister not think it would be a good thing to have an inquiry both into the diagnostic criteria and into the question of whether it is a really good thing to have a panel of medical experts functioning as a final appeal tribunal for benefit claims? Mr. PEAKE: I cannot accept that the proportion of successful claims in different districts shows that there is any wide variation in diagnosis in those districts. The fact is that the conditions giving rise to the disease, the form of the disease itself, and the awareness of the risk of disease vary greatly from district to district.

Deaths from Gas Poisoning

Replying to a question, Mr. GEOFFREY LLOYD, Minister of Fuel and Power, said that he shared the public anxiety regarding the increasing number of cases of gas poisoning in this country. It was unfortunately an unexpectedly complicated problem because the idea that it was simply the old gas mains which caused this trouble was not borne out by the facts. Quite new gas mains in perfect condition had caused trouble in severe weather. That was why a special engineering investigation was being made. This was particularly a problem of older people and the Ministry were in touch with the old people's organisations with regard to it.

Mercury Poisoning and Pink Disease

Replying to a question, Mr. IAIN MACLEOD, Minister of Health, said that he was advised that the degree of association between mercury poisoning and pink disease had not been clearly established. Many cases of pink disease had no demonstrable association with ingestion of mercury and the great majority of children who had been given mercurial preparations showed no sign of the disease. It seemed possible that some few infants might have an exceptional sensitivity to mercury. In 1952 and 1953, 64 children under five years old were certified as having died from pink disease and 4 from mercury poisoning; in 2 cases both pink disease and mercury poisoning were mentioned in the death certificate.

Radioactive Substances

Mr. FREDERICK WILLEY asked the Minister of Labour how many members of H.M. inspectorate of factories were specially qualified to deal with the effect of the use of radioactive substances.—Mr. HAROLD WATKINSON replied: Six officers at headquarters with appropriate qualifications and experience have made a special study of the problem from the medical, scientific, and technical angle, and the chief inspector of factories draws freely upon the expert advice of members of the radiological advisory panel of the statutory advisory committee appointed under the Radioactive Substances Act, 1948, of the radiological protection service of the Medical Research Council, and of the Atomic Energy Authority itself. Instruction has been given to all inspectors in the precautionary methods to be adopted in the use of radioactive substances.

Medical Standards in the R.A.F.

Mr. GEOFFREY DE FREITAS asked the Under-Secretary of State for Air what changes there had been in the last two years in the medical standards for regular commissions in the general duties branch of the Royal Air Force.—Mr. GEORGE WARD replied: Standards of visual acuity have been slightly raised and the standard of colour perception slightly reduced.

Psychiatric Social Workers in Scotland

Replying to questions Mr. JAMES STUART, Secretary of State for Scotland, said that psychiatric social workers were employed at 11 of the 34 mental hospitals in Scotland. Provision of aftercare for mental cases was undertaken for the most part by the Scottish Association for Mental Health and its local branches. In 1953–54 contributions to the funds of the association were made by 41 of the 55 local health authorities, comprising the councils of 22 counties and 19 large burghs.

Obituary

ALEXANDER FLEMING

Kt, M.B. Lond., F.R.C.P., F.R.C.S., F.R.S.

"While working with staphylococcus variants a number of culture-plates were set aside on the laboratory bench and examined from time to time. In the examinations these plates were necessarily exposed to the air and they became contaminated with various micro-organisms. It was noticed that around a large colony of a contaminating mould the staphylococcus colonies became transparent and were obviously undergoing lysis."

IN these matter-of-fact words Fleming announced the discovery of penicillin in 1929. It has sometimes been suggested that his observation was mere luck, and that he was unaware of the momentous possibilities of the substance which had fallen into his hands. But this suggestion is mistaken. Fleming himself agreed that he enjoyed good fortune in his discovery, but he had long been on the look-out for just such a substance as penicillin proved to be. He did not delay in testing whether it was harmful to leucocytes, and he organised trials of its efficacy as a dressing for surface wounds twelve years before other investigators were able to prepare the substance in stable form and in sufficient quantity for its use as we know it today. After 1940, as a result of brilliant work and great determination at Oxford, penicillin became a miracle drug; but Fleming could still justly say: "It was bound to happen sometime." He may have thought regretfully that he might have pursued the problem further in the years immediately after 1928; but his conclusion always was: "I was no chemist." It was essentially as a naturalist that he regarded himself, and his approach to bacteriology proved the accuracy of this self-assessment. He took pleasure in the great variety of ways in which life was revealed in bacteria. The beautiful, the curious, and the unexpected held an attraction for him, and this attitude sharpened his observation. It would not be true to say that he was without preconceived ideas, but it could be said that his natural curiosity would always be stronger than any hypothesis that might be in his mind at the outset of a piece of work. It could also be said that some of his preconceived ideas fully justified themselves—the faith in "natural antiseptics," for example, which led him as early as 1914–18 to put forward the proposition that the chemical laboratory might be neither the best nor the only place in which to seek for substances that could destroy bacteria without unduly disturbing the tissues and natural defences of the body. As befitted a born naturalist, he was a master of bench work and laboratory methods of all kinds, and he took real pleasure in demonstrating the elegance of his methods for measuring the amount of penicillin in the blood—nearly as much pleasure, it often seemed, as he took in discovering penicillin itself. It was characteristic of him that, when he realised that he could not at once use penicillin for treatment, he successfully exploited its possibilities as a technical aid in the isolation of hæmophilus organisms. Interestingly enough, only a few months ago, he admitted that he rated his discovery of lysozyme as of greater potential significance than that of penicillin.

[© *Life* International]

Fleming sometimes spoke of a conviction that he was divinely guided in his great discovery, and this attitude did not commend itself to all his fellow scientists. But natural curiosity and sincere piety are not incompatible qualities. To a man of Fleming's time, brought up in the atmosphere of rural Scotland at the end of the 19th century, it was as natural and inevitable to say that a great and beneficial discovery like penicillin could not have been made by himself alone as it was to say grace before meat.

He was born at Darvel in 1881, one of the seven children of an Ayrshire farmer. He went to the village school and later to Kilmarnock Academy, but he was still only a lad of 13 when he came to London to join his brother, who was a doctor in practice in Marylebone. After a couple of years at the Polytechnic Institute in Regent Street, he took a junior post in a shipping firm, joined the London Scottish, and was soon a crack shot as well as a first-rate swimmer. Later he used to recall how on a hot summer day the London Scottish in their kilts outmarched some famous regiments on the way to Bisley and won the inter-regimental shooting competition.

Four years later a small legacy made it possible for him to make a fresh start, and on his brother's advice he decided to study medicine. He went back to his elementary studies, passed the London Matriculation examination, and gained the senior natural science entrance scholarship at St. Mary's Hospital medical school. (It was said that he chose St. Mary's because it then had a specially fine swimming team.) From that time his innate ability showed itself. He won almost all the scholarships and prizes, and in 1908 he took honours in half a dozen subjects in the M.B. examination and won the university gold medal. A year later he took the F.R.C.S. "in his stride."

It was a happy coincidence that Almroth Wright should have been developing his bacteriological researches at St. Mary's at the very time that Fleming was seeking for an opening. After qualification he entered Wright's laboratories, and soon, by his skilful technique, his accurate observation, and his tremendous zest for work, won a secure place in the remarkable team then working there. D. W. C. J. recalls them one by one:

"Almroth Wright himself, the man of theory and its practical application; Stewart Douglas perhaps the leader in technical ingenuity and manipulative skill; John Freeman, who demonstrated the phenomenon of autoinoculation by variations in the opsonic index, who first made and used a pertussis vaccine; Leonard Noon, with whom he devised methods for the diagnosis and treatment of hay-fever by means of pollens; John Wells, who died prematurely from a laboratory infection with glanders; John Matthews, very successful on the therapeutic side; William Parry Morgan, who first induced *partial* pneumothorax in the treatment of phthisis; and Leonard Colebrook, later distinguished for his work on puerperal fever and on burns. Fleming's contributions were the technique of a miniature Wassermann reaction, which gave very good results; a medium for, and the production of a vaccine for, acne; and the use for the first time in England of 'Salvarsan,' Ehrlich's no. 606, in syphilis. Ehrlich had given Wright a quantity of the drug for experimental use. Fleming's results were good, and I recall a sketch

of a kilted soldier standing to attention with a syringe and needle as big as a rifle and bayonet, above the legend 'Private 606.'"

Before the first world war Fleming had started private practice in Devonshire Place, where besides vaccine and general bacteriological work he developed the serology of venereal disease and the use of salvarsan in treatment. But all this stopped with the outbreak of war, and Fleming was soon with Wright in Boulogne as one of his team studying modern methods of treating war wounds. His well-known work on the use and abuse of antiseptics started there, and later he was sent to carry it further in a large hospital in Wimereux, specialising in femur wounds. A. B. P., who shared the same hut for a year, writes:

"We were overwhelmed with the work of investigating and treating these wounds, gas-gangrene being one of the terrible complications, and at that time too the influenza epidemic caused hundreds of deaths. Blood-transfusion by the citrate method was started there by us, and Fleming had ample opportunity to exercise his exceptional talents in the study of wound and septicæmic infections. His notes were always precise and clear in his very neat handwriting, and his graphs and charts covered the walls of our hut laboratory. His industry was untiring and he was always on the look out for new ideas, or stunts as he called them. At the same time we managed to have fun. He laid out a putting-green which was used occasionally at night with candles in the holes."

After the war Fleming did not take up private practice again, but became assistant director of the inoculation department at St. Mary's and professor of bacteriology in the Medical School. He was a good, if not impressive, lecturer, but his most valuable quality as a teacher was his friendliness and willingness to help. He took great trouble and would often advise a form of technique with full details written out at length in his own hand. As Sir Almroth Wright took a less active part in running the institute, Fleming had more and more administrative work to do. But he did not allow his research to be disturbed. From 1922 to 1924 he was particularly engrossed with lysozyme, one of the body's natural protective agents, which he discovered when investigating the bacteriology of a cold he had caught. In 1929 the discovery of penicillin was announced as a series of typically accurate deductions based on a casual observation. His investigations of the antiseptics were continued in a comparison of their antibacterial and antileucocytic powers and led on to his studies of the sulphonamides.

After the development of penicillin at Oxford in the war years Fleming was inevitably drawn from his laboratory to receive the honours accorded him by universities, cities, and nations; for the world, with good reason, wished to give him thanks. With Howard Florey and E. B. Chain, he received the Nobel prize for medicine in 1945. His honorary degrees ranged from Princeton to Louvain. He was a freeman of Darvel and of Verona; an honorary chief of the Kiowa tribe; and a member of the Pontifical Academy of Sciences. His presidencies included the Society for General Microbiology and the London Ayrshire Society. In 1944 he was created a knight bachelor. His own colleagues in sciences and medicine had elected him F.R.S. in 1943, and F.R.C.P. in 1944. He had received the Moxon medal of the Royal College of Physicians, the Cameron prize of the University of Edinburgh, and the gold medal of the Royal Society of Medicine. Towards all these awards his attitude was characteristically modest; but some gave him special pleasure, including (as V. Z. C. recalls) the medal given him by the Pope in a personal interview.

"From more humble folk there also came remarkable evidence of the universal gratitude. He was much moved when on one occasion as he dismounted from a train at a station in Spain he found the people on the platform kneeling down as he approached. He was also proud of the illuminated message of congratulation and thanks sent him by a group of girls in a school in the Middle West of America. With all his distinctions he remained unspoilt. Perhaps the best testimony of this is to be found in *Who's Who*, where he placed at the end of his long list of honours a final entry, clearly meant to cap the lot, 'Private in the London Scottish for 14 years.'"

At St. Mary's and in London, Fleming's professional work and interests continued. In 1947, on Wright's death, he became director of what was soon to become the Wright-Fleming Institute. In this position he stimulated research and instituted demonstrations as a regular thing so that juniors could inform every other department about the type of work they were doing. From 1945 to 1948 he was a member of the Medical Research Council, and from 1946 onwards he was chairman of the committee responsible for arranging trials of streptomycin and other antibiotics in non-tuberculous conditions. Last year he resigned from the directorship of the institute, but he did not retire from the institute. Only the day before he died he was planning with his colleagues research in natural immunity which he hoped to begin on his return from a lecture tour in the Middle East.

Another thread of Fleming's life lay in Chelsea where he lived for many years. Himself an artist of talent, he was elected an honorary member of the Chelsea Arts Club in the '20s, and, as G. E. B. says, he was an active member.

"Winter and summer for over thirty years he would slip unobtrusively into the long, low building in Old Church Street, about six o'clock, soon to be embroiled in a desperate struggle at billiards or snooker. He was no mean performer; his concentration on the shot was ferocious, and it was reinforced by a stream of telling badinage directed against his opponents. Meantime, between shots, he was accessible to all. Thanks to him, and his colleagues at St. Mary's, hundreds of artists found help from medicine or surgery, and indeed it was an axiom at the club—'if there is anything seriously the matter, ask Sandy.' As the years went by he seemed to grow younger, not older, and as his honours increased he grew, if possible, simpler and more modest.

"Inevitably he posed for many of his friends, though, curiously, he eluded most of them. Probably the best portrait is that painted by the late T. C. Dugdale, R.A., but perhaps the best rendering of the essential Fleming is the bust by E. R. Bevan. A head by Dyson-Smith also has considerable charm."

But the centre of his life was of course the Wright-Fleming Institute, and his colleagues there knew him best of all. For them R. C. writes:

"Fleming had most of the qualities that make a great scientist: an innate curiosity to find out how things work, insight into the heart of a problem, ingenuity in devising simple apparatus and simple experiments to test new hypotheses, persistence in seeing the job through, and that physical and mental toughness which is essential to the top-class investigator. He also had to an unusual degree the 'seeing eye' that observed what many of us would miss.

"He carried his curiosity into everything he did, whether at work or play. Only two days before he died, he received a stereoscopic projector for his colour films—for he was a keen and expert photographer—and took considerable pleasure in assembling this toy and demonstrating it to us. His insight was rather that of the pragmatic mind which sees particularly the practical applications resulting from the solution of a problem. His ingenuity in devising simple apparatus was one of his outstanding assets; neat and deft with his hands, he was a superb technician and it was always a pleasure to watch him at work on the bench. He it was who devised or perfected many of the capillary and glass-slide techniques that became an integral part of the Almroth Wright school of microbiology, and it gave him great pleasure to hear Sir Macfarlane Burnet acknowledge his debt to these micro-techniques. Fleming held very strongly the view that the laboratory worker should be his own technician.

"His persistence might be part of an inherited Scottish trait: certainly he was most unwilling ever to admit defeat. But, if baulked, he had a flexibility of mind that allowed

him to try another tack. He had also great powers of endurance. Short and stockily built, with powerful square shoulders and a deep chest, he kept his freshness and jaunty step to the end. He was not an easy man to know: taciturn and laconic, conversation with him was apt to be short and one-sided. Yet he was fond of people and, even before he became famous, had many good friends in different walks of life.

"Despite his frequent journeyings abroad, he maintained his laboratory interests and was making new and interesting discoveries to the end."

Sir Alexander Fleming's first wife, Miss Sarah McElroy, died in 1949. They had one son who is a doctor. His second wife, Dr. Amalia Coutsouris, whom he married in 1953, was with him when he died from a heart attack on March 11. He is to be buried in St. Paul's Cathedral.

Diary of the Week

MARCH 20 TO 26

Monday, 21st

HUNTERIAN SOCIETY
8.30 P.M. (Talbot Restaurant, London Wall, E.C.2.) Sir Daniel Davies, Dr. Donald Reid, Dr. F. H. K. Green: An Assessment of Some New Drugs.

Tuesday, 22nd

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1
5 P.M. Prof. W. Melville Arnott: Order and Disorder in Pulmonary Function. (Second of two Oliver-Sharpey lectures.)
UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Prof. Lester Cahn (Columbia): Oral Medicine.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Medicine.* Dr. H. A. Sissons, Dr. Paul Fourman, Dr. C. E. Dent: Osteoporosis.
INSTITUTE OF DERMATOLOGY, St. John's Hospital, Lisle Street, W.C.2
5.30 P.M. Dr. G. C. Wells: Pigmented Tumours.

Wednesday, 23rd

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Prof. W. W. Mushin: Measurement in Anæsthesia. (Joseph Clover lecture.)
GUY'S HOSPITAL MEDICAL SCHOOL, St. Thomas' Street, S.E.1
5 P.M. Sir Lionel Whitby: Evolution of the Treatment of Addison's Anæmia. (Addison lecture.)
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. J. H. Sheldon: Social Aspects of Old Age.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Henry Haber: Cellular Nævi and Melanomas.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
5.30 P.M. Dr. Imrich Friedmann: Otitis Media—Experimental and Human. (Second of two lectures.)
INSTITUTE OF ORTHOPÆDICS, Royal National Orthopædic Hospital, 234, Great Portland Street, W.1
8 P.M. Prof. O. Scaglietti (Florence): Closed Treatment of Congenital Dislocation of the Hip.
EUGENICS SOCIETY
5.30 P.M. (Royal Society, Burlington House, W.1.) Dr. Hilda Lewis: Inadequate Parents and Psychological Disorders in their Children.
UNIVERSITY OF OXFORD
5 P.M. (Radcliffe Infirmary.) Prof. C. H. G. Macafee: Solid Ovarian Tumours.
MANCHESTER MEDICAL SOCIETY
4.30 P.M. (Medical School.) *Medicine.* Dr. James Sharp: Differential Diagnosis of Ankylosing Spondylitis.
LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool, 3
8 P.M. *Pathology.* Dr. G. R. Wadsworth: Effects of Hæmorrhage in Man. Dr. S. E. Keidan: C-reactive Protein.
BIRMINGHAM MEDICAL INSTITUTE, 154, Great Charles Street, Birmingham, 3
8 P.M. *Psychiatry.* Dr. J. M. Jefferson, Mr. J. T. Allanson, M.SC., Mr. P. T. Geach: Mind and Body.

Thursday, 24th

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. R. W. Riddell: Epidemiology of Fungous Diseases.

Friday, 25th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Prof. Robert Bradlaw: De Cute Oris. (Hunterian lecture.)
ROYAL SOCIETY OF MEDICINE
5 P.M. *Epidemiology and Preventive Medicine.* Dr. J. A. H. Lee, Dr. Josefine Webb: National Service Medical Examinations and Epidemiological Research.
8.15 P.M. *Obstetrics and Gynæcology.* Mr. E. Parry Jones, Mr. Alistair Gunn: Use of Kielland's Forceps.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY
3.30 P.M. Mr. K. G. Rotter: Aural Vertigo.
ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street.
5 P.M. Prof. E. J. Wayne: Clinical Surveys and Clinical Trials.

Notes and News

MENTAL NURSES REFLECT ON THEIR JOB

THE staff college for ward sisters, set up some years ago by King Edward's Hospital Fund for London, has just held a course for sisters and male charge nurses from mental hospitals. This was a new departure, being not only the first course for mental-hospital staff, but the first mixed course, to be held at the college; and it has been an unqualified success. Lectures, followed by discussions, ranged over hospital and ward administration, the care of patients, and the training of nurses; and visits were made to various mental and mental-defective hospitals, to Roffey Park Rehabilitation Centre, and to the psychiatric department of a general hospital. It is always interesting and a little sobering to see what other people are doing: a mildly complacent confidence, among the members, that all was well and fully up to date in their own hospitals, was replaced, as the course proceeded, by a healthy uncertainty: and many asked for advice on the best ways of putting new ideas across to their colleagues, when they got back.

A final discussion on the value of the course was warmly favourable: all felt they had learnt much which they would be able to use in their work. The relation of the sister tutor and the ward sister, in their joint task of training nurses, was discussed at this session; and it was generally felt that these two prime educationists were too far separated by custom and practice. They need to be in much closer touch with each other. Sister tutors were said to be too academic in their training, perhaps prescribing standards which it would be impossible to maintain in the wards. In the absence of sister tutors the other side of the argument could not be put; but the suggestion that the ward sister should have a say in the training syllabus seems thoroughly reasonable. It was also suggested that, before being appointed to charge of a ward, a sister might well spend a short period—a week perhaps—in the sister tutor's department. Another proposal was that ward sisters should be able to meet and discuss nurse training with the tutor either on an educational committee or at weekly meetings of a procedure committee. At all events, members of this course were determined that they were going to make closer touch with their sister tutors when they returned to their hospitals.

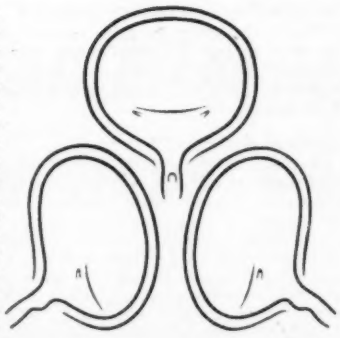
There was general agreement that, from the student nurse's point of view, case-assignment adds greatly to the interest of the work, and might—if coupled with better training—help to reduce wastage. There are special difficulties, however, about arranging case-assignment in mental hospitals, for student nurses are off for two full days every week. Group assignment—in which several patients are assigned to the care of a group of nurses, headed by a staff nurse or a third-year student—would be more feasible and probably more satisfactory.

Many of the members were working under unfavourable conditions. Most of our mental hospitals are old and out of date, and in many of them sanitary annexes are inadequate and inconvenient and cleaning equipment primitive. In the past, lack of money has caused delay in introducing improvements, but this no longer holds. Reasonable expenditure on the mental hospitals is being encouraged by the Government, and the King's Fund have already made generous grants towards improvements. Members of the course felt that they had been accepting inconveniences with rather too much resignation, and that the time had now come for them to press for improvements. In many places extra amenities for the patients are now being provided by "friends of the hospital"; but such leagues of friends are by no means universal, and there seems to be no fixed plan for establishing them. One member of the course had had the initiative to start such a league herself, beginning with friends and relatives of patients in her own ward; and it is to be hoped that others will follow her lead. Apart from the direct benefit to patients and staff of an active league of friends, there are indirect benefits: a strong league of friends can help to break down prejudice against mental hospitals, spread information among the general public, and reduce substantially the objection many parents feel to allowing their daughters to enter mental nursing.

CYSTOSCOPY DIAGRAM STAMP

Mr. Alec W. Badenoch, F.R.C.S., writes: For noting findings made at a cystoscopy some surgeons use separate charts; but these are expensive and bulky. To record successive

observations on, say, a case of bladder neoplasm, I find a diagrammatic representation of the bladder useful. With most bladder stamps it is difficult to indicate the presence of seedlings near the internal urinary meatus, especially when the growth is on the anterior wall or in the posterior urethra. The composite stamp illustrated obviates this difficulty, and allows the surgeon to record whether the growth has extended into or through the bladder wall.



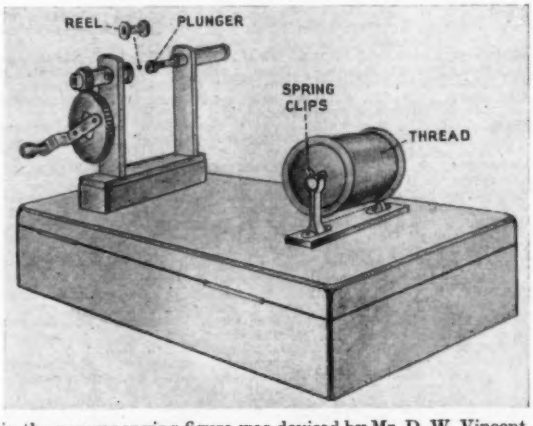
I have to thank Miss Wadsworth of the Institute of Urology for making the final drawing. The stamp was cut by, and can be obtained from, Messrs. E. M. Richford, 9, Snow Hill, London, E.C.1.

ECONOMIES IN DRUGS AND DRESSINGS

In a letter to hospital authorities [1] the Ministry of Health discusses ways of cutting expenditure on drugs and dressings. Though some 3000 different drugs are used by most general hospitals, four-fifths of the total expenditure is usually accounted for by 30 main items; and the Ministry suggests that hospital medical committees should investigate the prescribing of these items with a view to effecting economies. The more expensive antibiotics should be used only when strictly necessary, and vitamins should not be prescribed routinely except for sound medical reasons. Before prescribing expensive surgical dressings (e.g., gauze) the cheaper alternatives should first be considered; and non-proprietary preparations, wherever these are cheaper, should be prescribed rather than proprietary preparations. Since many drugs deteriorate if unsuitably stored, ward stocks should be kept small, and the pharmacist should check them regularly. The Ministry suggests that a standing committee, with representatives from the medical, pharmaceutical, and nursing staff, should be set up in each hospital to advise on these matters.

A NEW LIGATURE WINDER

Mr. R. N. Jones writes: "Winding reels of ligature material by hand is laborious, and even with experience the results are not always to the surgeon's satisfaction. The machine shown



in the accompanying figure was devised by Mr. D. W. Vincent, instrument technician to Colchester hospital group. It does the job simply and rapidly; and, since it winds at an even tension, the ligature is smooth-running and less likely to break when in use. Reels of any size can be wound; they are held in place by a plunger."

The winder is made by the Electro Surgical Instrument Company Ltd., 37A, New Cavendish Street, London, W.1.

1. 94154/3/54, dated March 3, 1955.

University of Cambridge

On March 5 the following degrees were conferred:

M.Chir.—G. R. C. Peatfield.
M.B., B.Chir.—A. M. Freeman, *George Yerbury.
M.B.—*Inez R. Aldous, J. A. Dryden, R. J. C. Pearson.
* By proxy.

University of London

Honorary fellowships of University College have been conferred on Prof. A. Bradford Hill, F.R.S., Dr. A. J. Morland, and Prof. Solly Zuckerman, F.R.S.

University of Birmingham

Mr. A. L. D'Abreu, part-time lecturer in surgery, has been given the title of reader in thoracic surgery, and Dr. W. Trevor Cooke has been appointed part-time reader in medicine on giving up his appointment as reader. Mr. A. J. H. Rains, Mr. P. G. Bevan, and Mr. Geoffrey Slaney have been appointed lecturers in surgery. Mr. Slaney has been awarded the first Frank Barnes travelling fellowship in America.

On Wednesday and Thursday, May 11 and 12, at 6 P.M., Prof. Wilfrid Gaisford will give the Leonard Parsons lecture, on the Protection of Infants against Tuberculosis.

University of Nottingham

At a congregation to be held on April 22 for the installation of the Duke of Portland as chancellor of the university, the honorary graduands will include Sir Henry Cohen, who will receive the degree of D.SC.

Royal College of Surgeons of England

At a meeting of the council on March 10, with Sir Harry Platt, the president, in the chair, Sir Geoffrey Marshall was awarded the Tudor Edwards lectureship for 1955. The second Lady Cade medal was awarded to Squadron-Leader Peter Howard, and the Hallett prize to D. Singh (Patna).

Royal College of Physicians of London

On Tuesday and Thursday, April 19 and 21, Dr. A. M. Cooke will give the Lumleian lectures, on Some Aspects of Skeletal Disease. On Tuesday and Thursday, May 3 and 5, Sir Horace Evans will give the Croonian lectures, on the Significance of Certain Symptoms in Disease of the Kidneys. All the lectures will be held at 5 P.M. at the college, Pall Mall East, S.W.1.

Royal College of Physicians of Ireland

The following have been admitted to the membership:
Kale Mohan Basu (in absentia), W. R. Shanahan, O. M. P. Tobias.

Royal Society of Edinburgh

The David Anderson-Berry Medal and Prize (£100) will be awarded in 1956 by the society for the best work on the therapeutical effect of X rays on human diseases. Further particulars may be had from the general secretary of the society, 22, George Street, Edinburgh, 2.

University of Melbourne

Mr. Maurice Ewing, senior lecturer in surgery at the Postgraduate Medical School of London, has been appointed to the new chair in surgery in this university.

Mr. Ewing, who is 43 years of age, was educated in Edinburgh at Daniel Stewart's College and at the university. He graduated in 1935 with honours and was awarded the Ettles scholarship. After holding house-appointments in Edinburgh and Leicester he joined the R.N.V.R. in 1940 and served till 1946 with the rank of surgeon lieut.-commander. After demobilisation he held appointments as tutor at the Edinburgh Royal Infirmary and at the Victoria Infirmary, Glasgow, before he took up his present appointment in 1947. In 1950 he worked at the Memorial Hospital in New York with a British-American exchange scholarship. His published works have dealt mainly with proctology and the management of malignant disease of the mouth. In 1950 he gave a Hunterian lecture on villous tumours of the rectum.

Dr. R. R. H. Lovell, senior lecturer in medicine at St. Mary's Hospital Medical School, has been appointed to the new chair of medicine.

Dr. Lovell, who is 36, studied medicine at St. Mary's Hospital Medical School, qualifying in 1941. During the remaining years of the war he served as a surgeon lieutenant in the R.N.V.R. and was mentioned in despatches. After demobilisation he held a house-appointment at the Brompton Hospital and a registrarship at St. Mary's Hospital. He took the M.B. in 1946, the M.R.C.P. in 1947, and the M.D. in 1948. He was awarded a Nuffield lectureship to visit North America in 1953. During the last five years he has been concerned with the investigation of connective-tissue diseases and the mode of action of cortisone. His published work includes papers on clubbing of the fingers, the modification of inflammation by cortisone and other substances, and the description of a factor, discovered in the serum of patients with rheumatoid arthritis, which causes necrosis when injected in guinea-pig's skin.

Royal Institute of Public Health and Hygiene

The Harben medal has been awarded to Lord Adrian, O.M., P.R.S., and the Smith award to Dr. Kenneth Cowan.

National Association for Maternal and Child Welfare

The annual conference of this association will be held at Church House, Westminster, on June 23 and 24. Further particulars may be had from the secretary of the association, Tavistock House North, London, W.C.1.

Symposium Neuroradiologicum

This meeting will be held in London from Sept. 13 to 17. The programme includes discussions on cerebrovascular disease, the localisation of intracranial tumours by means of isotopes, and applications of stereotaxometry. Further information may be had from Dr. R. D. Hoare, The National Hospital for Nervous Diseases, Queen Square, W.C.1.

Association of Surgeons of Great Britain and Ireland

This association will hold its annual meeting in Glasgow from April 14 to 16, under the presidency of Sir Clement Price Thomas. There will be discussions on Obstructive Jaundice, Postoperative Care, and Occlusive Vascular Disease. Further particulars may be had from the secretary of the association, 45, Lincoln's Inn Fields, W.C.2.

Royal Australasian College of Surgeons

Alan Newton Prize.—The subject chosen for the next award of this essay prize is the Pathogenesis and Surgical Treatment of Developmental Abnormalities of the Kidneys and Ureters. Candidates must be fellows of the Royal Australasian College of Surgeons, the Royal College of Surgeons of England, the Royal College of Surgeons of Edinburgh, or the Royal College of Surgeons in Ireland, or fellows in surgery of the Royal Faculty of Physicians and Surgeons of Glasgow. Entries must be sent to the secretary of the college, Spring Street, Melbourne, C.1, by Dec. 1, 1956.

University of Saskatchewan

This university has lately expanded its medical school, and medical students may now complete their clinical training in Saskatoon. A university hospital of 550 beds has been opened and five full-time chairs established. The new professors are Dr. J. W. Gerrard (pædiatrics), Dr. Eric Nanson (surgery), Dr. Irwin M. Hilliard (medicine), Dr. Albert E. Brown (obstetrics and gynæcology), and Dr. D. G. Mckerracher (psychiatry). The dean of the school is Dr. J. Wendell Macleod.

Dr. Gerrard, who is 38, was born in Northern Rhodesia. He studied medicine at Oxford and Birmingham, graduating B.M. in 1941. He spent the remaining years of the war as a regimental medical officer, and in 1946 he returned to Birmingham as R.M.O. at the Children's Hospital. While working under Dr. L. M. Masterman at the Selly Oak Hospital he took the M.R.C.P. in 1947. Later he was appointed medical registrar at the Children's Hospital, and in 1948 he took up his present post. Last year he spent six months in the United States working under Dr. Lawson Wilkins at Johns Hopkins Hospital, Baltimore. His published work includes a study of the natural history of kernicterus, and papers (jointly) on the treatment of phenylketonuria and of cœliac disease.

McGill University, Montreal

Prof. R. V. Christie has been appointed professor of medicine and chairman of the department of medicine in the university. He has also been appointed physician-in-chief of the Royal Victoria Hospital, Montreal.

Professor Christie, who is 52 years of age, was educated in China and at George Watson's College, Edinburgh. He graduated M.B. at the University of Edinburgh in 1925, and, after holding house-appointments at the Edinburgh Royal Infirmary, he went to New York as assistant in the department of applied physiology of the Rockefeller Institute for Medical Research, and in 1927 was awarded the Gunning Victoria Jubilee prize for his investigations there. The following year he moved to Montreal to become resident medical officer at the Royal Victoria Hospital. In 1929 with a Travers Allan scholarship he spent some months in Freiburg under Aschoff. On his return to Montreal he was appointed research associate in the McGill University research clinic of the Royal Victoria Hospital. He returned to this country in 1935 on his appointment as assistant director of the medical unit of the London Hospital. In 1937 he was awarded the gold medal of the University of Edinburgh for his M.D. thesis. He was appointed to the chair of medicine at St. Bartholomew's Hospital in 1938. In 1942 he took the D.Sc. Lond. and the same year he was elected F.R.C.P. The following year he delivered the Goulstonian lectures of the Royal College of Physicians, on emphysema. Dr. Christie is a member of the senate of London University. His published work includes papers on respiratory function in disease and the use of antibiotics in subacute bacterial endocarditis.

Breeding of Laboratory Animals

The Laboratory Animals Bureau will hold a symposium on this subject at 1, Wimpole Street, London, W.1, on Monday, May 9, at 10 A.M. This symposium is open to scientific, medical, and veterinary graduates, and to senior technicians.

Medical Society of London

At this society's 175th anniversary dinner, held at the Royal College of Surgeons of England on March 8, the Duke of Gloucester remarked that Lettsom, in founding the society, had aimed to enable members of the profession to meet on terms of equality in order to discuss matters of common interest; and the Lettsom tradition had helped to keep the society active and strong. In reply, Sir Horace Evans, the society's president, gave evidence of the society's continuing and growing strength: meetings, he said, were well—sometimes uncomfortably well—attended. He recalled a further remarkable feat by Lettsom. In an age when the sick poor were treated "with a callousness impossible to believe," he had founded a dispensary, the first of its sort, on which patients could call for domiciliary visits by consultants. Sir Harry Platt, F.R.C.S., responded to Dr. E. R. Cullinan's cordial and witty welcome to The Guests.

Hunterian Society

On March 10 this society formally presented to the Royal College of Surgeons the coat-of-arms of John Hunter, which, with that of Lister, is incorporated in the balcony of the gallery of the college's new great hall. In handing over the arms, Dr. W. S. C. Copeman, the president, described them as a gift from "our society to your society." Though divided over the date of Hunter's birth, which the Hunterian society celebrates on Feb. 13 and the college on Feb. 14, they were united in honouring the man and his work. Dr. Copeman could not but admit a certain difficulty in that John Hunter had no coat-of-arms; and the one appearing in the balcony was actually that of his brother, William Hunter. In no way discomposed by this revelation, and overlooking the inaccuracy of the society's research on birthdays, Sir Harry Platt, F.R.C.S., gratefully accepted the arms on behalf of the college, and said that a plaque would be placed in the hall to commemorate the gift.

CORRIGENDUM: *Pharmacology of Reserpine.*—In this leading article last week (p. 548) the footnote numbered 26 should have appeared as 25, and that numbered 25 as 26.

Appointments

BROCK, B. H., M.B. Camb., F.R.C.S.: registrar in orthopædic and traumatic surgery, Winford Orthopædic Hospital, and United Bristol hospitals.

CARROLL, JAMES, M.B. N.U.I., D.P.H., D.C.H.: district M.O.H. and asst. county M.O.H., Burton Latimer, Corby, Desborough, and Rothwell urban districts, and Kettering rural district.

CLEMENTS, P. A. H., M.R.C.S.: asst. senior M.O., headquarters staff of the East Anglian R.H.B.

GAMAN, R. H., B.M. Oxfd, D.P.M.: consultant psychiatrist and medical superintendent, Risbridge Hospital, Kedington, and Riversfield Home, St. Neots.

GOWANS, J. A., L.R.C.P.E.: senior casualty officer, Wansbeck H.M.C.

GRIFFITH, A. H., M.B. Lond., D.P.H.: senior M.O., Cardiff.

GRIFFITHS, J. J., M.R.C.S., T.D.D.: whole-time asst. chest physician, mid-Wales group.

HAIGH, R. D., M.B. Leeds, D.P.H., D.OBST.: senior asst. M.O., Brighouse Corporation, Elland urban district council, and West Riding county council.

MASON R. M., D.M. Oxfd, M.R.C.P.: consultant physician, department of physical medicine, London Hospital.

METGUD, V. S., M.B. Bombay, F.R.C.S.E.: senior casualty officer, Tees-side H.M.C.

O'CONNELL, J. J., O.B.E., M.B. N.U.I., D.M.R.D.: radiologist, Tipperary (S.R.) county council.

PRICE, MARY, M.B.: school M.O. and asst. M.O.H., Brighton.

STAFFORD-CLARK, DAVID, M.D. Lond., M.R.C.P.: physician-in-charge, department of psychological medicine, and director of the York Clinic, Guy's Hospital, London.

WOLMAN, LIONEL, M.D. Camb., M.R.C.P., D.P.M.: consultant neuropathologist, Royal Infirmary Unit, United Sheffield Hospitals.

The Hospital for Sick Children, Great Ormond Street, London:

BAMFORD, F. N., M.B. Manc.: house-surgeon.
CHEESE, J. A., M.D. Lond., D.C.H.: house-physician.
STEPHENS, ROSEMARY, M.B. Lond., D.C.H.: house-physician.
VUCKOVIC, DRAGOMIR, M.B. Birm.: house-physician, neurological and neurosurgical department.

Appointed Factory Doctors:

DAWE, E. B., M.R.C.S.: Ventnor, Southampton.
WOOD, L. A. C., M.B. Camb., D.OBST.: Penshurst, Kent.

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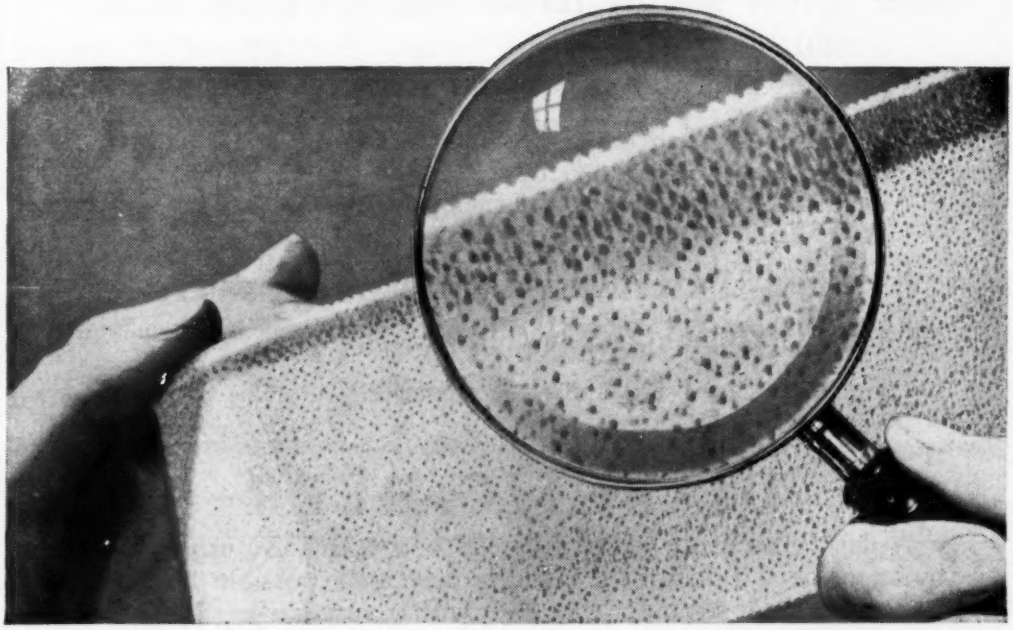

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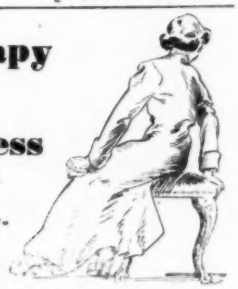

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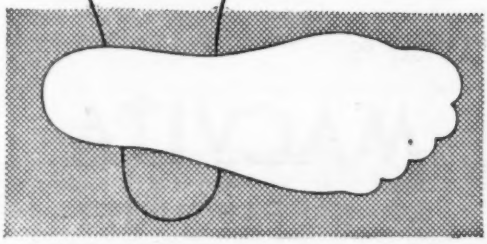

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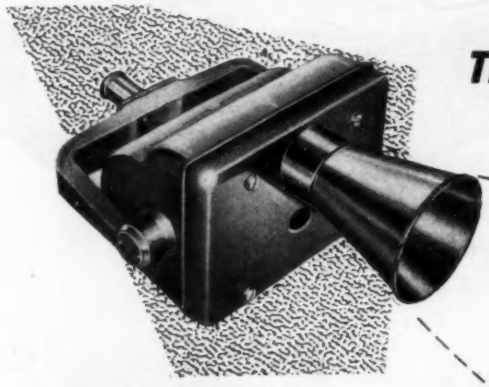

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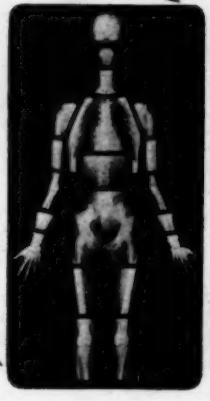

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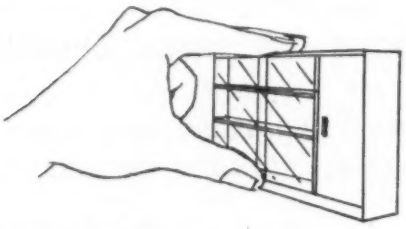

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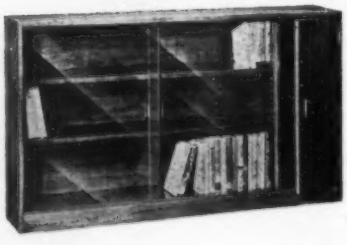

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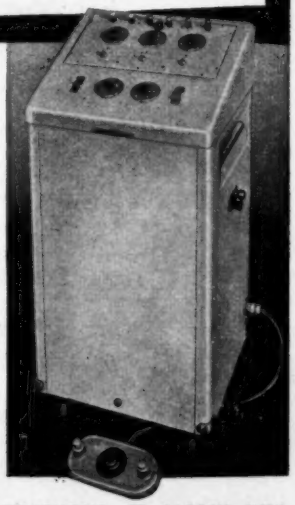

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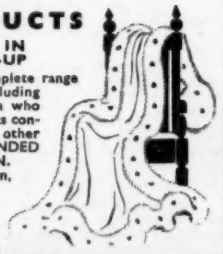

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Academic and Educational

COURSE IN ADVANCED ORTHOPÆDICS
at the
INSTITUTE OF ORTHOPÆDICS
28TH MARCH–1ST APRIL, 1955

Monday, 28th March, Town Section, 234, Great Portland-street, W.1 (Lecture Room)
10.40 A.M.–12.40 P.M. Scoliosis .. .. .. Mr. J. I. P. JAMES
2.00 P.M.–3.00 P.M. Bacteriological Aspects of Joint Tuberculosis .. Dr. C. H. LACK
3.00 P.M.–4.00 P.M. Volkmann's Contracture .. Mr. H. J. SEDDON
Tuesday, 29th March, Town Section
10.15 A.M.–11.15 A.M. Metabolic Disorders of Bone .. Dr. R. NASSIM
11.30 A.M.–12.40 P.M. Pain Down the Arm .. Dr. P. F. SANDIFER
2.00 P.M.–4.00 P.M. Medical Aspects of Tuberculosis .. Dr. F. H. STEVENSON
Wednesday, 30th March, Town Section
9.45 A.M.–10.45 A.M. Bone Repair .. .. .. Dr. H. A. SISSONS
11.00 A.M.–12.40 P.M. Peripheral Vascular Disorders .. Mr. G. L. W. BONNEY
2.00 P.M.–3.00 P.M. Biochemistry in Orthopædics .. Dr. P. G. WALKER
3.00 P.M.–4.00 P.M. Slipped Femoral Epiphyses .. Mr. H. J. BURROWS
Thursday, 31st March, Country Section, Brockley Hill, Stanmore, Middlesex (Hut 5)
10.30 A.M.–12.40 P.M. General Clinical Demonstration .. Mr. D. TREVOR
1.45 P.M.–2.45 P.M. Spondylolisthesis .. .. Mr. P. H. NEWMAN
2.45 P.M.–4.30 P.M. The Early Treatment of Paralysis in Poliomyelitis .. Mr. D. M. BROOKS
Friday, 1st April, Country Section
10.30 A.M.–12.40 P.M. General Clinical Demonstration .. Mr. K. I. NISSEN
2.00 P.M.–3.00 P.M. Plaster of Paris Technique .. Mr. E. L. TRICKEY

The fee for the course (including lunch and tea) is 7 guineas. Early application should be made to the Dean at the Town Section.

INSTITUTE OF DISEASES OF THE CHEST

REFRESHER COURSES 1955

Refresher courses in diseases of the chest, including tuberculosis, will be held at the Brompton Hospital from 11TH to 15TH JULY and at the London Chest Hospital from 3RD to 7TH OCTOBER, 1955. These courses are intended for Consultants and Senior Hospital Medical Officers, to whom they are open without fee.

Further information, including detailed programmes, may be obtained on application to the Dean, Institute of Diseases of the Chest, Brompton, S.W.3.

THE TAVISTOCK CLINIC

CENTRAL MIDDLESEX GROUP HOSPITAL MANAGEMENT COMMITTEE

INTRODUCTORY COURSE ON PSYCHOLOGICAL PROBLEMS IN GENERAL PRACTICE

New course of 8–10 discussion meetings for a limited number of general practitioners will start in MID-APRIL, on 1 afternoon per week (either WEDNESDAY or THURSDAY). Admission is free.

Apply in writing for further particulars to Medical Director, Tavistock Clinic, 2, Beaumont-street, W.1, stating which day is preferable.

NUFFIELD FOUNDATION DOMINION TRAVELLING FELLOWSHIPS

NEW ZEALAND

The Nuffield Foundation offers a TRAVELLING FELLOWSHIP IN MEDICINE to nationals of New Zealand preferably between the ages of 25 and 35 years. The purpose is to enable medically qualified persons to obtain in the United Kingdom such postgraduate training and experience as may be necessary to prepare them to undertake medical teaching and research work in New Zealand. Applicants should possess high intellectual and personal qualities.

A Fellow will be required to carry out at an approved institution a programme of work and training approved by the Nuffield Foundation. A Fellow will not be permitted to prepare for, or to take examinations for, higher degrees or diplomas awarded by bodies in the United Kingdom.

The Fellowships are normally tenable for 1 year and provide for maintenance and return travelling expenses of a Fellow and, if he is married, for the travelling expenses only of his wife. The total value of an award, including travelling expenses, varies with the needs and family responsibility of the holder, but will in no case be less than £900.

Applications for Fellowships to begin in 1955 should be submitted not later than 30th April, 1955, to the undersigned. Copies of the conditions and forms of application are also available at the Nuffield Foundation, Nuffield Lodge, Regent's Park, London, N.W.1. R. E. CORBETT.

Department of Chemistry, University of Otago, Dunedin, New Zealand.

BURDEN NEUROLOGICAL INSTITUTE, Bristol. Required, a medical officer interested in research in neuropsychiatry to act as ASSISTANT at the above Institute. Initial appointment for 1 year. Opportunities for research work in neurology, electrophysiology and psychiatry.

Applications to be made to the Director of the Institute.

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL

RADCLIFFE CROCKER TRAVELLING SCHOLARSHIP IN DERMATOLOGY

Applications are invited for the Radcliffe Crocker Travelling Scholarship in Dermatology. The Scholarship is of the approximate value of £1000. It is tenable for a period of 12 months from 1st October, 1955, to be spent at places of study approved by the Academic Board, at least 1 of which must be outside the United Kingdom. Candidates must be British subjects, students of a London Medical School, and graduates of a University in the United Kingdom.

Applications must be submitted not later than 31st May, 1955. For further particulars, apply to the Dean.

H. L. BIRKS, Secretary.

NUFFIELD ORTHOPÆDIC CENTRE, Headington, OXFORD. The Trustees invite application from suitably qualified persons for the following scholarship :—

THE LORD NUFFIELD SCHOLARSHIP IN ORTHOPÆDIC SURGERY.

Total value £800 p.a. tax free, plus £160 p.a. living-out allowance.

Applications, giving full personal details, together with the names of 2 referees, to be addressed to the undersigned from whom full particulars can be obtained.

JOHN MULLINS, Secretary to the Trustees.

Wingfield-Morris Orthopædic Hospital.

THE UNIVERSITY OF LIVERPOOL. Applications are invited for the post of LECTURER in the Department of Bacteriology. A medical qualification is not essential. The initial salary will be within the range £650–£1200 p.a., according to qualifications and experience.

Applications, stating age, qualifications, and experience, together with the names of 3 referees, should be received not later than 15th April, 1955, by the undersigned, from whom further particulars of the conditions of appointment may be obtained. STANLEY DUMBELL, Registrar.

THE UNIVERSITY OF MANCHESTER. Applications are invited for the post of LECTURER or ASSISTANT LECTURER in the Clinical Section of the Rheumatism Research Centre. Salary : Lecturer, on a scale rising to £2000 p.a. ; Assistant Lecturer, £700–£100–£1100 p.a. Status and initial salary according to qualifications and experience. Membership of the F.S.S.U. and children's allowance scheme.

Applications should be sent not later than 11th April, 1955, to the Registrar, The University, Manchester, 13, from whom further particulars and forms of application may be obtained.

UNIVERSITY OF DURHAM. Board of Governors of THE UNITED NEWCASTLE UPON TYNE HOSPITALS. NEWCASTLE REGIONAL HOSPITAL BOARD. Applications are invited for the CHAIR OF PSYCHOLOGICAL MEDICINE tenable in the Newcastle Division of the University. The person appointed will hold by Honorary contract the position of Consultant to the United Newcastle upon Tyne Hospitals and the Regional Hospital Board. Salary in accordance with the scale for Clinical Professors (£2500–£2850 a year ; in exceptional cases £3100) with membership of F.S.S.U.

Further particulars may be obtained from the undersigned, with whom 20 copies of applications, giving the names of 3 persons to whom reference may be made, should be lodged not later than 23rd April, 1955. Applicants outside the United Kingdom may submit 1 copy only.

E. M. BETTENSON, Registrar.

University Office, 46, North-bailey, Durham.

THE UNIVERSITY COLLEGE OF KHARTOUM, Sudan. Applications are invited for appointment to CHAIR OF ANATOMY. Salary £E2500 p.a. Cost-of-living allowance at present approximately £E150 p.a. Outfit allowance £50 on first appointment. Passages for appointee and family on appointment, termination, and annual leave. Appointment on contract for 3–7 years (renewable) with bonus on completion (1 months salary for each year of service).

Detailed applications (8 copies), naming 3 referees, to be received by 15th April by Secretary, Inter-University Council, 1, Gordon-square, London, W.C.1, from whom further information may be obtained.

THE UNIVERSITY COLLEGE OF KHARTOUM, Sudan. Applications are invited for (1) SENIOR LECTURESHIP or (2) LECTURESHIP IN PUBLIC HEALTH. Salary scales : (1) £E1750–£E75–£E1975–£E2090–£E2170 p.a. ; (2) £E1300–£E75–£E1825 p.a. Point of entry determined by qualifications and experience. Cost-of-living allowance now approximately £E150 p.a. Outfit allowance £50 on first appointment. Passages for appointee and family on appointment, termination, and leave (each long vacation after first). Appointment on contract for 3–7 years (renewable) with bonus on completion (1 months salary for each year of service).

Detailed applications (8 copies), naming 3 referees, to be received by 15th April, 1955, by Secretary, Inter-University Council, 1, Gordon-square, London, W.C.1, from whom further information may be obtained.

AUSTRALIA. UNIVERSITY OF SYDNEY. Applications are invited for the position of SENIOR LECTURER IN PHYSIOLOGY. It is particularly desired that the successful applicant engage in research in the fields of cardiovascular or respiratory physiology. The salary for a Senior Lecturer is within the range of £A1500–£A1750 p.a., with annual increments of £A50. The salary is subject to deductions under the State Superannuation Act. The commencing salary will be fixed according to the qualifications and experience of the successful applicant. Finance available for home purchase under Staff Members' Housing Scheme.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 5, Gordon-square, London, W.C.1. The closing date for the receipt of applications, in London and Australia, is 30th April, 1955.

THE UNIVERSITY OF SHEFFIELD. Applications are invited for the following posts :—

(1) LECTURER IN ANATOMY,

(2) DEMONSTRATOR IN ANATOMY,

to begin duties on 1st October, 1955. Salary scales : Lecturer £800–£100–£1700 ; Demonstrator £700–£50–£800. Initial salary on either scale according to qualifications and experience.

Further particulars should be obtained from the Registrar to whom applications (4 copies) should be sent by 23rd April, 1955.

BRITISH EMPIRE CANCER CAMPAIGN invites applications from suitably qualified British subjects for EXCHANGE FELLOWSHIPS IN CANCER RESEARCH during 1955–56. Fellowships are of 1 years tenure in North America at a stipend of $4000 p.a., which will be paid by the National Cancer Institute of Canada to Fellows proceeding to Canada, and by the American Cancer Society to Fellows proceeding to the United States. Travelling expenses to and from centre of work will be borne by the Campaign.

For further particulars and application forms apply to the Secretary General, British Empire Cancer Campaign, 11, Grosvenor-crescent, Hyde Park Corner, London, S.W.1. The closing date for the receipt of applications is 31st March, 1955.

Hospital Services : Senior Appointments

MIDDLESEX HOSPITAL, W.1. Applications invited for the post of ASSISTANT PHYSICIAN for Diseases of the Skin (Consultant) for 4 half-days weekly. Candidates must be Fellows or Members of the Royal College of Physicians of London.

Applications, naming 3 referees, should be sent to the Deputy Superintendent by 16th April.

ST. THOMAS'S HOSPITAL, London, S.E.1. Anæsthetist. Consultant status with membership of the Medical Committee. 6 sessions per week.

Applications (12 copies), including names and addresses of 3 referees, to the Clerk of the Governors by 3rd April, 1955.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

Stoke-on-Trent Group

CONSULTANT PHYSICIAN (part-time, 9 notional half-days weekly). Duties City General Hospital, Stoke (780 Beds —6 notional half-days), Haywood Hospital, Tunstall (96 Beds —2 notional half-days), Westcliffe Hospital, Cheadle (213 chronic beds—1 notional half-day). Wide experience specialty, higher qualification required.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 4th April, 1955.

EXETER CLINICAL AREA. South-Western Regional HOSPITAL BOARD. Applications are invited from registered medical practitioners for the appointment of ASSISTANT RADIOTHERAPIST in the Exeter Clinical Area. The appointment will be on a whole-time basis in the Senior Hospital Medical Officer grade. The successful candidate will be required to work under the general direction of the Consultant Radiotherapist mainly at the Royal Devon and Exeter Hospital, Exeter, but may be required to work at other hospitals in the Clinical Area as determined by the Regional Board from time to time. Opportunities for experience in radio-active isotope work will be available.

Applications (12 copies), stating date of birth, qualifications, and experience, together with 12 copies of 2 testimonials, and the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 2nd April, 1955.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT ASSISTANT ANÆSTHETIST (Senior Hospital Medical Officer) to the Burnley and District Hospital Centre (Burnley General and Victoria Hospitals, Reedyford Hospital, Nelson, &c.). Successful candidate will work under general guidance of a Consultant and should live in or near Burnley. Higher qualification in anæsthetics essential.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 28th March, 1955.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of Full-time SENIOR HOSPITAL MEDICAL OFFICER (non-resident). Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Applications, giving details of past experience and qualifications, together with the names of 3 referees, to be addressed to the undersigned as early as possible. (Special application forms can be obtained on request.)

F. J. CABLE, Secretary, United Manchester Hospitals.

MIDHURST, SUSSEX. KING EDWARD VII SANATORIUM. Applications are invited from registered medical practitioners for the appointment of CHIEF ASSISTANT MEDICAL OFFICER. The appointment and conditions of service, salary, &c., will be comparable with the grade of Senior Hospital Medical Officer. Candidates should have had experience in the treatment of tuberculous and non-tuberculous chest disease. An unfurnished house is available if required. The post is superannuable and continuance of National Health Service superannuation can be arranged.

Applications, with full particulars of age, qualifications, and experience, together with the names and addresses of 3 referees, should be sent to the Medical Superintendent, "A."

NEWCASTLE REGIONAL HOSPITAL BOARD. SUNDERLAND AREA HOSPITAL MANAGEMENT COMMITTEE. (Main hospitals : Royal Infirmary, 300 Beds ; General, 517 Beds ; Ryhope General, 280 Beds.) CONSULTANT ANÆSTHETIST, whole-time, or part-time for minimum of 9 notional half-days per week.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 28 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Special AREA FOR CUMBERLAND AND NORTH WESTMORLAND. SENIOR CASUALTY OFFICER (whole-time) for East Cumberland Group of hospitals : main hospital Cumberland Infirmary, Carlisle (340 Beds) ; to work under general supervision of 1 or more Consultant Surgeons and 1 or more Consultant Orthopædic Surgeons. Doctor appointed to reside near the Cumberland Infirmary, Carlisle. Appointment for a period not exceeding 4 years ; commencing salary within the scale £1500–£1950 p.a.

Applications, with names and addresses of 3 referees, to the Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 28 days.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

Full-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade), Warley Hospital, Brentwood, Essex. Resident post. Modern unfurnished house available.

Applications (6 copies), and names of 3 referees, should reach the Secretary, 11A, Portland-place, London, W.1, by Saturday, 2nd April, 1955.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) CHILD PSYCHIATRIST (Senior Hospital Medical Officer), 6 half-days a week, Child Guidance Clinic, 58, Hampton-road, Twickenham. Clinic may be visited by appointment with Area Medical Officer, Elmfield House, High-street, Teddington.

Applications by 18th April, 1955.

(2) CHILD PSYCHIATRIST (6 half-days a week), Bedfordshire Child Guidance Service. Duties include clinics at 3, St. Peter's-street, Bedford, Health Centre, Dunstable, and 11, Gordon-street, Luton. Salary Senior Hospital Medical Officer scale. Clinics may be visited by direct appointment.

Applications by 21st April, 1955.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

NORTH GLOUCESTERSHIRE CLINICAL AREA. SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Appointment of Medical Superintendent to Horton Road and Coney Hill Hospitals, Gloucester. Applications are invited from registered medical practitioners for the whole-time appointment of CONSULTANT PSYCHIATRIST to the North Gloucestershire Clinical Area which comprises Gloucester, Cheltenham, Stroud, Forest of Dean and adjoining districts. Applicants should have had wide experience in psychiatry, and must possess the Diploma in Psychological Medicine. The successful candidate will have charge of beds at Horton Road and Coney Hill Hospitals, Gloucester, and will act as Medical Superintendent of these hospitals ; in addition, he will be required to visit other hospitals in the Clinical Area as may be determined by the Regional Board from time to time. A house will be available.

Applications (12 copies), stating date of birth, qualifications, and experience, together with 12 copies of 2 testimonials, and the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 2nd April, 1955.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Locum Tenens SENIOR HOSPITAL MEDICAL OFFICER in Chest Diseases for the Hampshire Area for the period April–October. Chest Clinics and Sanatoria.

Applications immediately to Area Secretary, South West Metropolitan Regional Hospital Board, Highcroft, Romsey-road, Winchester.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill a vacancy for a Whole-time ASSISTANT PSYCHIATRIST in the St. Francis and Lady Chichester Group of hospitals for duty mainly at St. Francis Hospital, Haywards Heath, Sussex. Candidates must have had wide experience in psychiatry ; experience in modern methods of treatment is essential and possession of a higher qualification is desirable. Salary within the scale £1500–£50–£1950. Applicants may visit the Hospital.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 2nd April, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of ASSISTANT OPHTHALMOLOGIST for duties in Ayrshire. The appointment will be part-time remunerated on the basis of 8 notional half-days per week. Salary (at age 32 and over) on the scale £1500–£50–£1950. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, not later than 30 days after the publication of this advertisement.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Medicine. DUNDEE ROYAL INFIRMARY AND MARYFIELD HOSPITAL, DUNDEE. Applications are invited for the post of ASSISTANT PHYSICIAN (Consultant) at Dundee Royal Infirmary (510 Beds) and Maryfield Hospital, Dundee (400 Beds), general teaching hospitals associated with the University of St. Andrews. The duties of the appointment will cover work in the wards and Outpatient Department in Dundee Royal Infirmary and in the Unit of the Professor of Therapeutics at Maryfield Hospital, and also responsibility as Visiting Physician to Westgreen (Mental) Hospital, by Dundee (660 Beds). Clinical teaching duties are associated with the appointment. The post will be on a whole-time or maximum part-time basis in the option of the successful candidate.

Further particulars and forms of application may be obtained from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 19th April, 1955.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Chest and Tuberculosis. Applications are invited for the whole-time appointment of a CHEST PHYSICIAN (Consultant) for duty in the Tuberculosis Service in the Dundee and Arbroath area. Duties are in respect of both inpatients and outpatients and the person appointed must be prepared to undertake certain teaching duties on behalf of the University of St. Andrews. Salary in accordance with the recognised scale for Consultants. Other conditions of service in accordance with national agreement.

Forms of application and further particulars from the Secretary, "Braeknowe," 430, Blackness-road, Dundee, with whom applications must be lodged not later than 19th April, 1955.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a PHYSICIAN (Consultant status), on a basis of 6 sessions per week, at the Royal Infirmary of Edinburgh, the duties to commence on 1st October, 1955. The person appointed will be required to take part in undergraduate and postgraduate clinical teaching. The appointment is subject to National Health Service regulations.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 18th April, 1955.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT RADIOLOGIST required Cardiff Area 1st August–10th September, 1955.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

WELSH REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer) Whitchurch Hospital, Cardiff. Candidate should possess D.P.M. Successful candidate will work under Consultant Psychiatrists.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

AUSTRALIA. ROCKHAMPTON HOSPITAL, QUEENSLAND. Part-time SPECIALIST appointments. Applications in writing are invited for appointment for 3 years to the following part-time specialist appointments at the Rockhampton Hospital.

Physician: 1 session of 3 hours per week divided into an outpatient session of 2 hours and an inpatient session of 1 hour. Salary £290 p.a.

Ear, Nose and Throat: 1 outpatient session of 3 hours per week and 1 inpatient session of 3 hours per week. Salary £580 p.a.

Rockhampton has a population of 42,000 and is the centre of a district of 90,000 in population. Further particulars regarding position and opportunity for private practice will be forwarded upon request. Appointees to be not over 60 years of age.

Applications should be addressed to the Secretary, Rockhampton Hospitals Board, Rockhampton. Applications close on 11th May, 1955.

NEW ZEALAND. THAMES HOSPITAL BOARD. Applications are invited from registered medical practitioners for the full-time appointment of ASSISTANT MEDICAL SUPERINTENDENT, Thames Hospital. It is desirable that main interests of the appointee should lie in medicine and anaesthetics. Salary in accordance with Hospital Employment Regulations as either Senior Registrar £NZ887 12s.–£NZ1002 12s., plus board and lodging if single and furnished residence if married; or Junior Specialist £NZ1371 7s.–£NZ1671 7s., with residence available and heat and light and furniture at a deduction of £178 10s. Duties to commence 1st July, 1955. Conditions of appointment and form of application may be obtained from the Office of the High Commissioner for New Zealand, 415, Strand, London, W.C.2, England, or the undersigned.

Applications addressed to the Secretary, P.O. Box 53, Thames, should be posted air-mail and close on Monday, 2nd May, 1955.

F. HOPKINSON, Secretary, Thames Hospital Board.

Thames, New Zealand.

Hospital Services: Junior Appointments

ALBERT DOCK ORTHOPÆDIC AND FRACTURE HOSPITAL, Alnwick-road, E.16. SEAMEN'S HOSPITALS GROUP. Required on 16th April SENIOR HOUSE OFFICER for receiving-room duties. Post which is recognised by the Royal College of Surgeons provides excellent experience in a wide variety of traumatic conditions received from the adjacent dockland and from shipping in the Port of London.

Applications, stating age, nationality, qualifications and experience, with the names of 2 recent referees, should be sent to the Group Secretary, Dreadnought Seamen's Hospital, Greenwich, S.E.10, not later than 4th April.

BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11. RESIDENT SURGICAL OFFICER (Junior Hospital Medical Officer grade), vacant end of March.

Apply Hospital Secretary, enclosing copies of 2 recent testimonials.

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.11. HOUSE PHYSICIAN (resident), vacant 30th April, 1955. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 4th April.

BROMPTON HOSPITAL, S.W.3. Applications are invited for the post of Part-time RADIOLOGICAL REGISTRAR for attendance up to 6 sessions weekly, for 1 year in the first instance. Candidates are required to hold a Diploma in Diagnostic Radiology.

Applications, stating age, qualifications, nationality and appointments held with dates, and copies of 3 testimonials, by 2nd April to KENNETH A. F. MILES, House Governor.

CHARING CROSS HOSPITAL GROUP. Applications are invited for the post of SURGICAL REGISTRAR (resident) tenable at Wembley Hospital for 1 year in the first instance from 1st June, 1955. Salary and conditions in accordance with terms of service of hospital medical staff and subject to deduction for board-residence.

Applications, with copies of testimonials, should be sent to the undersigned not later than 2nd April, 1955.

FRANK HART, Secretary to the Board.

Charing Cross Hospital, London, W.C.2.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of FIRST HOUSE SURGEON, with charge of general surgical beds. Appointment for 6 months from 1st May, 1955. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 22nd March, 1955.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of SECOND HOUSE PHYSICIAN. Appointment for 6 months from 1st May, 1955. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 22nd March, 1955.

FULHAM HOSPITAL, St. Dunstan's-road, Hammersmith, W.6. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications invited for appointment at above Hospital as SURGICAL REGISTRAR. Candidates may visit the Hospital by arrangement with the Hospital Secretary.

Applications (6 copies to be completed) by 1st April, 1955, on forms obtainable from Group Secretary (L.86), 5, Collingham-gardens, London, S.W.5.

GERMAN HOSPITAL, London, E.8. (General—157 Beds.) Applications are invited from registered medical practitioners for the 6 months appointment of HOUSE SURGEON (vacant now) and should be sent to the Group Secretary, Hackney Hospital, London, E.9, quoting GH/HS.

GROUP PATHOLOGICAL LABORATORY at St. Mary ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICERS (pathology). 2 positions for duty in first instance at the Group Laboratory. Posts vacant 1st May, 1955. Resident posts.

Applications by 25th March, 1955, on forms obtainable from Hospital Secretary (L.83), St. Mary Abbots Hospital, Marloes-road, Kensington, W.8.

GUY'S HOSPITAL, S.E.1. Applications are invited for the appointment of REGISTRAR to the Radiotherapy Department (whole-time). D.M.R. preferred but not essential. Duties to commence as soon as possible.

Forms of application, obtainable from the Superintendent, Guy's Hospital, should be forwarded not later than 12th April, 1955.

HACKNEY HOSPITAL, London, E.9. (General—844 Beds.) Applications for the 6 months appointment of CASUALTY OFFICER AND E.N.T. HOUSE SURGEON (House Officer grade), now vacant, should reach the Group Secretary at above address, as soon as possible, quoting HH/CHO.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT REGISTRAR (pædiatric) required mid-May. Certain duties will be required at the West London Hospital.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 28th March.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time RESIDENT REGISTRAR (thoracic surgery) required 1st May.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 28th March.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT REGISTRAR (radiotherapy) required 1st June.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 26th March.

KING'S COLLEGE HOSPITAL, Denmark-hill, S.E.5. Applications are invited for the post of REGISTRAR to Medical Firm C. The appointment, which is subject to the terms and conditions of service for medical and dental staffs, will be from 18th April, 1955, to 30th September, 1955, and will be subject to reappointment.

Applications, stating age, education, qualifications and experience, with the names of 2 referees, should be sent to the undersigned by 31st March, 1955.

S. W. BARNES, House Governor.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited for appointment as RESIDENT CASUALTY OFFICER, vacant 1st May, 1955. The position is graded as Senior House Officer or House Officer, according to experience, recognised for the F.R.C.S.

Forms of application from the Physician-Superintendent on receipt of a stamped addressed envelope.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of SENIOR REGISTRAR to the Radiodiagnostic Department becoming vacant on 1st May, 1955. Candidates must hold a Diploma in Radiology or Radiodiagnosis.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the House Governor by 31st March, 1955. H. BRIERLEY, House Governor.

MEMORIAL HOSPITAL, Woolwich, S.E.18. Casualty OFFICER (recognised for F.R.C.S.), vacant 14th April. 6 months resident appointment. Senior House Officer grade. Salary £745 p.a., less £150 p.a. for residence.

Apply to Secretary.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited for the posts of RESIDENT MEDICAL OFFICER, to commence 8th May, 1955, and HOUSE PHYSICIAN (resident) to commence 8th May, 1955, at Maida Vale Hospital for Nervous Diseases, London, W.9. Appointments in the first instance for 6 months, renewable. Grading as Senior House Officer or Registrar according to experience. Preference will be given to candidates holding a higher degree and previous neurological experience will be an asset.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary at Maida Vale Hospital, not later than 2nd April, 1955.

PRINCESS BEATRICE HOSPITAL, Earls Court, S.W.5. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (general medicine) 3 half-days per week, Tuesday A.M. and P.M., Friday P.M.

Application forms from Group Secretary, St. Luke's Hospital, Chelsea, S.W.3 (enclose foolscap stamped addressed envelope).

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. CHELSEA HOSPITAL FOR WOMEN. HOUSE SURGEON (Senior House Officer), resident post for 1 year from 1st August, 1955.

Applications to be sent to the House Governor to the Board of Governors by 11th April, 1955, on forms obtainable from 339, Goldhawk-road, London, W.6.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. QUEEN CHARLOTTE'S MATERNITY HOSPITAL. JUNIOR OBSTETRIC OFFICER (Senior House Officer), resident post tenable for 6 months from 1st July, 1955.

Applications to the House Governor to the Board of Governors by 11th April, 1955, on forms obtainable from 339, Goldhawk-road, London, W.6.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. BERNHARD BARON MEMORIAL RESEARCH LABORATORIES. A REGISTRAR will be required in April at the above Laboratories. Previous specialised experience is not essential. The successful candidate will receive training in serology and bacteriology, and may later assist in the research work. The post is resident.

Applications to the House Governor to the Board of Governors by 4th April, 1955, on forms obtainable from 339, Goldhawk-road, London, W.6.

ROYAL FREE HOSPITAL. Applications are invited for the post of SENIOR REGISTRAR to the Gynæcological and Obstetric Department. The post is full-time and recognised under the Senior Registrar establishment. Duties to commence 1st July, 1955. Candidates should be members of the Royal College of Obstetricians and Gynæcologists.

Applications, together with names of 3 referees, should be sent to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, not later than 7th April, 1955.

ROYAL FREE HOSPITAL GROUP. Applications are invited for the appointment of REGISTRAR (Woman) to the Gynæcological and Obstetric Department of the Elizabeth Garrett Anderson Hospital, with some duties at the Hampstead General Hospital. Applicants must be registered medical practitioners of not more than 10 years qualification. The appointment is full-time, non-resident, for 1 year in the first instance, duties to commence 1st June, 1955. Salary and conditions of service in accordance with those laid down by the Ministry of Health.

Applications, with the names of 3 referees, to be sent to the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, London, W.C.1, not later than 7th April, 1955.

ROYAL MARSDEN HOSPITAL (late Royal Cancer Hospital), Fulham-road, London, S.W.3. Applications are invited for the posts of :—

(1) SURGICAL REGISTRAR (full-time) to begin duty immediately.

(2) SURGICAL SENIOR REGISTRAR (part-time) to begin duties in June, 1955. Applicants should state for how many sessions they are available.

Forms of application are obtainable from the House Governor to whom applications, together with copies of 3 recent testimonials, should be sent, not later than 28th March, 1955.

SOUTH LODGE HOSPITAL, World's End-lane, N.21. ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (first, second, or third post—not pre-registration), resident. General duties mainly surgical and E.N.T., as directed by the Medical Superintendent. National Health Service salary plus £50 p.a. Vacant 1st May, 1955.

Applications, with the names and addresses of 2 referees, to the Group Secretary, Chase Farm Hospital, The Ridgeway, Enfield, Middlesex.

SOUTH WESTERN HOSPITAL, Landor-road, S.W.9. RESIDENT HOUSE OFFICER (Senior House Officer grade) required to take charge of 32 surgical beds under the direction of the Surgical Consultant of Lambeth Hospital, Kennington; and also to work under the E.N.T. Surgeon at the South Western Hospital.

Form of application from the Group Secretary, Lambeth Group Hospital Management Committee, Renfrew-road, S.E.11.

ST. GEORGE'S HOSPITAL, S.W.1. Applications are invited for the post of ORTHOPÆDIC REGISTRAR. Candidates should hold the Diploma of the F.R.C.S. (England). The appointment is for 1 year in the first instance, and the successful candidate will be required to take up his duties as soon after 1st May, 1955, as possible.

Applications, giving details of age, education, qualifications, experience, and the names of 2 referees, should be received by the undersigned not later than 2nd April, 1955.

P. H. CONSTABLE, House Governor.

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. Applications are invited for the posts of 2 SENIOR HOUSE OFFICERS (casualty).

Applications, stating age, qualifications, experience, together with the names and addresses of 2 referees, to reach the Hospital Secretary by 28th March, 1955.

ST. JAMES' HOSPITAL, Balham, S.W.12. Locum Tenens REGISTRAR (anæsthetics), whole-time. Required for 3 weeks from 15th April.

Applications, stating age, qualifications, experience, and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, at above address, by 26th March.

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. (General—192 Beds.) CLINICAL ASSISTANT to the Consultant in Psychiatry required for 1 half-day session. Experience in short methods of psychotherapy, physical treatments and abreactive therapy desirable. Salary £175 p.a. per weekly half-day.

Applications, stating qualifications and experience, together with names and addresses of 2 referees, to be forwarded to Hospital Secretary by 26th March, 1955.

ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (Casualty Officer), resident or non-resident, required immediately. Post recognised for F.R.C.S.(Eng.). Candidates may visit the Hospital by arrangement with the Surgeon-Superintendent.

Applications by 25th March, 1955, on forms obtainable from Hospital Secretary (L.82).

ST. MARY'S HOSPITAL, W.2. Applications are invited from suitably qualified candidates for the post of Whole-time SENIOR REGISTRAR in the Venereal Diseases Department. The appointment is for a first period of 12 months as from 8th May, 1955, the holder being eligible for re-election.

Applications, stating nationality, date of birth, qualifications, dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 6th April, 1955.

ST. MARY'S HOSPITAL, W.2. Applications are invited for the post of Whole-time REGISTRAR in the Venereal Diseases Department. The appointment is for a period of 12 months as from a date to be arranged, the holder being eligible for re-election.

Applications, stating nationality, date of birth, qualifications, dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 6th April, 1955.

ST. MARY'S HOSPITAL, W.2. Applications are invited from suitably qualified practitioners for the post of non-resident Whole-time REGISTRAR in General Medicine. The successful candidate will be required to undertake work in the Casualty and Outpatient Departments as well as having certain inpatient duties. The appointment will be for a first period of 12 months with effect from 30th May, 1955.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and address of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 6th April, 1955.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. House SURGEON, vacant 1st May. Approved for Pre-registration Service. Recognised for F.R.C.S.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS. A vacancy will occur on 1st July, 1955, for the post of RESIDENT SURGICAL OFFICER at St. Philip's Hospital. Grading, Registrar first year. Appointment for 6 months with opportunity for extension.

Apply in writing (12 copies) and names of 2 referees, to the House Governor, St. Peter's Hospital, Henrietta-street, W.C.2. Closing date 30th April, 1955.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. Casualty OFFICER (with anæsthetic duties), Senior House Officer grade.

Applications, naming 2 referees, to Medical Superintendent immediately.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. Senior HOUSE OFFICER (general medicine including chest diseases), non-resident. Vacancy—immediately.

Applications, naming 2 referees, to Medical Superintendent.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 1st July, 1955, for a RESIDENT REGISTRAR to the E.N.T. Department (Registrar grade).

Further particulars and form of application, which must be returned not later than Monday, 2nd May, 1955, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY, 91, Dean-street, W.1. Applications are invited for the resident post of SENIOR HOUSE SURGEON. Candidates should have had surgical experience and previous neurological or neurosurgical experience would be an advantage.

Applications, stating age, qualifications, experience, together with the names and addresses of 2 referees, to reach the Hospital Secretary by 28th March, 1955.

WEST LONDON HOSPITAL, Hammersmith-road, W.6. Whole-time NON-RESIDENT REGISTRAR (general medicine) required immediately.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, The Hammersmith, West London, and St. Mark's Hospitals, Ducane-road, London, W.12, by 28th March.

WESTMINSTER HOSPITAL, St. John's-gardens, S.W.1. Applications invited for post of MEDICAL REGISTRAR for 1 year in first instance from mid-April.

Applications (6 copies), with names of 2 referees, to House Governor by 2nd April.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of HOUSE PHYSICIAN (post-registration) in the Group Geriatric Unit at above Hospital, which will be vacant from 8th May, 1955.

Application forms from the Hospital Secretary to be returned by 31st March, 1955.

ASHFORD HOSPITAL, Ashford, Middlesex. (600 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR in Radiology (whole-time, non-resident). Possession of a higher qualification desirable. Successful candidate also required to work at another hospital in the Group. Hospital may be visited by direct appointment with Medical Director.

Application forms obtainable from, and returnable to, Secretary, Staines Group Hospital Management Committee, Ashford Hospital, Ashford, Middlesex, by 29th March, 1955.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT SENIOR HOUSE OFFICER (Male) for general medical duties. Post vacant 12th April, 1955.

Applications, stating age, qualifications, and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital by 26th March, 1955.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT SENIOR HOUSE OFFICER (Male) for pathology. Previous clinical experience essential but pathological experience not essential.

Applications, stating age, qualifications, and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital immediately.

BATH HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from medical practitioners for the post of HOUSE SURGEON (orthopædic) which is a joint one between the Royal United and Bath and Wessex Orthopædic Hospitals, which are adjacent. Post graded Senior House Officer and offers experience in "cold" orthopædics including children, surgery of arthritis and traumatic surgery. Post vacant 1st April, 1955.

Applications, stating age, qualifications and experience, with 2 testimonials, should be forwarded to Group Secretary, Manor Hospital, Combe Park, Bath.

BEBINGTON, CHESHIRE. CLATTERBRIDGE HOSPITAL. (730 Beds.) CENTRAL WIRRAL GROUP. Applications are invited for the post of RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER (orthopædics/casualties), to commence on 1st May, 1955. Salary in accordance with current terms and conditions of service—i.e., £775–£50–£1075 p.a., less £150 p.a. for residence.

Application forms obtainable from Group Secretary, Clatterbridge Hospital, Bebington, Cheshire, to be returned by 6th April, 1955.

BIRMINGHAM, 15. ROYAL ORTHOPÆDIC HOSPITAL. (Long and short term orthopædic cases (non-traumatic). 336 Beds and extensive outpatient services.) SENIOR HOUSE OFFICER—registered medical practitioners, preferably with orthopædic experience.

Applications, with copies of testimonials, to Administrator.

BIRMINGHAM (SANATORIA) GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at West Heath Hospital, Rednal-road, Birmingham, 31 (210 Beds). The successful applicant will reside at the above Hospital (accommodation for single person only), and will be required to undertake duties at the Birmingham Chest Clinic, Great Charles-street, Birmingham, 3.

Applications, stating age, qualifications, training, and experience, together with copies of 3 recent testimonials, should be addressed to the Secretary, Birmingham (Sanatoria) Group Hospital Management Committee, Yardley Green Hospital, Birmingham, 9, as soon as possible.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. RESIDENT MEDICAL OFFICER (Senior House Officer). Post vacant end of March. General Hospital with 5 other Resident Medical Officers.

Apply Medical Superintendent.

BIRMINGHAM, 13. SORRENTO MATERNITY HOSPITAL. (112 Beds, including 24 premature baby cots.) OBSTETRIC HOUSE SURGEON. Recognised for D.Obst.R.C.O.G. Hospital affiliated to Birmingham Medical School for training of students. Vacant 1st May.

Applications to Obstetrician by 23rd March, 1955.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of NON-RESIDENT SENIOR HOUSE OFFICER for duty in the Casualty Department at the General Hospital, Birmingham. The post is tenable for 1 year. Candidates must be registered medical practitioners, and have held a resident appointment.

Forms of application may be obtained from, and should be returned as soon as possible to, the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15.

BIRMINGHAM. UNITED BIRMINGHAM HOSPITALS. BIRMINGHAM AND MIDLAND HOSPITAL FOR WOMEN, Showell Green-lane, SPARKHILL, BIRMINGHAM, 11. Applications are invited from registered medical practitioners for the post of RESIDENT GYNÆCOLOGICAL HOUSE SURGEON for duty with the Professorial Unit from 1st June, 1955. The appointment is recognised for the M.R.C.O.G.

Application forms, obtainable from the House Governor at the above address, to be returned not later than 2nd April, 1955.

BIRMINGHAM GROUP 9 HOSPITAL MANAGEMENT COMMITTEE. Whole-time JUNIOR HOSPITAL MEDICAL OFFICERS (2 posts). This Group of nearly 1400 Beds offers much scope for training in modern methods of mental deficiency treatment. Psychological investigation carried out in well-equipped clinical departments. Excellent opportunity for study of young children. Recognised for D.P.M. Married or single accommodation available.

Applications, with names and addresses of 2 referees, to Secretary, Coleshill Hall Hospital, Coleshill, Birmingham, as soon as possible.

BIRMINGHAM AND MIDLAND EAR AND THROAT HOSPITAL, Edmund-street, BIRMINGHAM, 3. Required, SENIOR HOUSE OFFICER or HOUSE OFFICER (including pre-registration), according to experience.

Detailed applications, with copies of 2 recent testimonials, to the Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. HIGHCROFT HALL HOSPITAL, ERDINGTON, BIRMINGHAM, 23. JUNIOR HOSPITAL MEDICAL OFFICER. This Mental Hospital (1227 Beds) provides opportunities for experience and training in all branches of psychiatry, and is recognised as a training centre for the D.P.M. Previous experience not essential. Single residential accommodation is available, but Officers who so desire may live outside the Hospital.

Applications, giving personal particulars and qualifications, should be submitted to the Medical Superintendent within 14 days.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Dudley, Stourbridge and District Hospital Group, The Guest Hospital, Dudley**

REGISTRAR in General Surgery for Guest Hospital, Dudley (154 Beds). Experience specialty essential. Higher qualifications desirable. Resident.

(2) **Shrewsbury Group Hospital Management Committee (Group 15), Royal Salop Infirmary, Shrewsbury**

SURGICAL REGISTRAR (resident) for Shrewsbury Group of hospitals. Duties mainly at Royal Salop Infirmary and Copthorne Hospital (170 surgical beds). Recognised for F.R.C.S. Higher qualification an advantage.

(3) **Stoke-on-Trent Hospital Management Committee, Princes-road, Hartshill, Stoke-on-Trent**

(*a*) Whole-time REGISTRAR in E.N.T. Surgery for North Staffordshire Royal Infirmary (455 Beds). Experience specialty essential. Resident or non-resident.

(*b*) Whole-time REGISTRAR in Thoracic Surgery for Stoke-on-Trent Group of hospitals. Duties at Cheshire Joint Sanatorium (305 Beds) and North Staffordshire Royal Infirmary (455 Beds). Experience general surgery essential. Higher surgical qualification an advantage.

(4) **West Bromwich and District Hospitals Group (No. 18), West Bromwich and District General Hospital, Edward-street, West Bromwich**

REGISTRAR in Pathology for West Bromwich Group. Well-equipped laboratory offering excellent opportunities for comprehensive pathological experience. Recognised for D.Path.

Application forms from Group Secretaries, to be returned before 4th April, 1955. Candidates may visit Hospitals.

BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. ROYAL VICTORIA HOSPITAL, Poole-road, WESTBOURNE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (resident) for E.N.T. and ophthalmic duties. Post vacant 25th March. In addition to duties at the above Hospital, the successful candidate will be required to assist in the E.N.T. outpatient clinics at the Royal Victoria Hospital, Boscombe, and the Poole General Hospital. The appointment is recognised for the D.O. and D.L.O. Diplomas.

Applications to the Deputy Hospital Secretary, Royal Victoria Hospital, Shelley-road, Boscombe.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, BOSCOMBE. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE PHYSICIAN. The post which becomes vacant on 20th April is recognised for pre-registration purposes.

Applications to the Deputy Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, BOSCOMBE. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of GENERAL HOUSE SURGEON. The post which becomes vacant on 20th April is recognised for the F.R.C.S. examination and for pre-registration purposes.

Applications to the Deputy Hospital Secretary.

BRADFORD, YORKSHIRE. THE ROYAL EYE AND EAR HOSPITAL. (105 Beds.) SENIOR HOUSE OFFICER required for E.N.T. Department of 56 Beds. Recognised for D.L.O. and F.R.C.S. Salary £745 p.a., less £150 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE GROUP HOSPITALS. (78 Beds.) SENIOR HOUSE OFFICER for duties in the E.N.T. Department of the above Group. Recognised for F.R.C.S. and D.L.O.

Applications, with details of experience, &c., together with the names of 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. SUSSEX EYE HOSPITAL, Eastern-road, BRIGHTON, 7. (56 Beds.) SENIOR HOUSE SURGEON (Senior House Officer) and HOUSE SURGEON (House Officer) required mid-April. Posts recognised for F.R.C.S. under 23 (b).

Applications, stating age, qualifications and experience, together with the names of 2 referees, to the Administrative Officer.

BRISTOL. WINFORD ORTHOPÆDIC HOSPITAL. (230 Beds.) Applications are invited from registered medical practitioners for post of SENIOR HOUSE OFFICER which is suitable for candidate reading for a higher grade qualification and is recognised for F.R.C.S. Hospital is staffed by Consultants of teaching hospital.

Apply, stating age, qualifications and experience, with testimonials, to Secretary.

BROXBURN, WEST LOTHIAN. BANGOUR GENERAL HOSPITAL. E.N.T. UNIT. Applications are invited for the appointment of SENIOR HOUSE OFFICER in the E.N.T. Unit at Bangour General Hospital, Broxburn, which is 15 miles from Edinburgh. The Unit comprises 30 Beds and also undertakes oral dental surgery. Salary and conditions of service will be in accordance with the regulations.

Applications, giving age, qualifications and particulars of previous experience, should be lodged with the Group Medical Superintendent, Bangour General Hospital, Broxburn, West Lothian.

BROXBURN, WEST LOTHIAN. BANGOUR GENERAL HOSPITAL. OPHTHALMIC UNIT. Applications are invited for the appointment of SENIOR HOUSE OFFICER in the Ophthalmic Unit (32 Beds) at Bangour General Hospital, Broxburn, which is 15 miles from Edinburgh. Salary and conditions of service will be in accordance with the regulations.

Applications, giving age, qualifications and particulars of previous experience, should be lodged with the Group Medical Superintendent, Bangour General Hospital, Broxburn West Lothian.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. (350 Beds.) SOUTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered practitioners or pre-registration candidates for the post of HOUSE SURGEON (general surgery—72 Beds). Immediate vacancy.

Apply, naming 2 referees, to—

K. G. T. LUXFORD, Esq., Secretary/Finance Officer.

The General Hospital, Bishop Auckland.

BISHOP'S STORTFORD AND DISTRICT HOSPITAL, Rye-street, BISHOP'S STORTFORD, HERTS. (67 Beds—medical, surgical and maternity. Midway between London and Cambridge. Main Line Railway from Liverpool Street.) Applications are invited from registered medical practitioners for RESIDENT HOUSE OFFICER (not pre-registration). Appointment to commence 7th May, 1955.

Applications, stating age, nationality, qualifications and experience, with copies of recent testimonials or names of referees should be sent to the Hospital Secretary, Haymeads Hospital, Bishop's Stortford, Herts.

BISHOP'S STORTFORD, HERTFORDSHIRE. HAYMEADS HOSPITAL. Applications are invited from registered practitioners for the post of HOUSE OFFICER (obstetrics), Male or Female, first, second or third post held, to commence 1st May, 1955, for period of 6 months. Duties in connection with Obstetric Department, Neonatal Nursery and Pædiatric Ward of 24 Beds. Salary £425–£525 p.a., less £125 in respect of resident facilities.

Applications, stating nationality, age, qualifications and experience, with copies of recent testimonials or names of referees, to Hospital Secretary as soon as possible.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (medical), Rossendale General Hospital. Resident or non-resident.

Applications, giving names of 2 referees, should be made to H. WILKINSON, Esq., Group Secretary.

Bury General Hospital, Bury, Lancs.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. BURY GENERAL HOSPITAL, BURY, LANCS. HOUSE OFFICER (surgery), pre-registration appointment. A vacancy exists at the present time.

Apply, stating age, qualifications and experience, to—

H. WILKINSON, Group Secretary.

BUSHEY MATERNITY HOSPITAL, Bushey Heath, HERTFORDSHIRE. (60 Beds.) RESIDENT OBSTETRIC HOUSE SURGEON for above Hospital. Post recognised for D.Obst. R.C.O.G. and for pre-registration purposes. 6 months appointment, vacant 12th April, 1955.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director, Edgware General Hospital, Edgware, Middlesex, by 26th March, 1955.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) The post of GENERAL SURGICAL AND UROLOGICAL HOUSE SURGEON (pre-registration, first, second, or third post), which is recognised for the F.R.C.S., becomes vacant in early April, 1955. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (276 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (casualty) which is now vacant. Salary £745 p.a. Recognised for the F.R.C.S.

Applications to be sent to the Hospital Secretary at the above Hospital, together with copies of 3 recent testimonials.

CARDIFF HOSPITAL MANAGEMENT COMMITTEE. (*a*) SENIOR HOUSE OFFICER (medical) required at Sully Hospital, Sully, Glam. (Thoracic Centre—324 Beds), commencing 1st April. Experience gained in investigation and treatment of lung and heart conditions.

(*b*) HOUSE OFFICER required in Accident Unit, St. David's Hospital, Cardiff (656 Beds), commencing 1st April. Practical experience gained in all types of injury under direction of a Consultant.

Form of application, in each case, from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CAERPHILLY DISTRICT HOSPITAL, near Cardiff. (175 Beds for acute medicine and surgery.) HOUSE SURGEON (pre-registration appointment) required at above Hospital. Married quarters available.

Apply to the Group Secretary, Rhymney and Sirhowy Valleys Hospital Management Committee.

CHELMSFORD AND ESSEX HOSPITAL. Applications are invited for the resident post of CASUALTY OFFICER (Senior House Officer). It is recognised for the F.R.C.S. and offers excellent experience in the treatment of fractures and diagnosis of acute medical and surgical emergencies. Opportunity is given for Casualty Officer to follow up his cases in the wards and to obtain operating experience in major theatre under the guidance of the Consultants or the Resident Surgical Officer. Off duty time is generous and the post is one likely to suit both an officer seeking a higher qualification in surgery or one intending General Practice. The vacancy will occur on 1st April. Salary £745 p.a., with £130 deducted for residential emoluments.

Apply Secretary, Chelmsford Hospital Management Committee, Chelmsford and Essex Hospital, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. (162 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON (pre-registration post). The post will become vacant on 16th April, and offers good surgical experience and is recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. Applications are invited from registered practitioners for the post of RESIDENT PÆDIATRIC HOUSE OFFICER (Male or Female) commencing as soon as possible, to work in the Pædiatric Unit of the Chelmsford Hospital Group. The Unit includes a Premature Baby Nursery of 10 cots and a Neonatal Department in the Maternity Block of the Hospital. The Department is recognised for the D.C.H.

Applications, stating age, nationality, qualifications and experience, together with recent testimonials, should be sent as soon as possible to the Group Secretary, Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHELTENHAM GENERAL AND EYE HOSPITAL. (170 Beds.) HOUSE SURGEON (pre-registration or otherwise) required.

Applications, together with the names of 2 referees, to be sent to the Group Secretary, General Hospital, Cheltenham.

CHELTENHAM GENERAL AND EYE HOSPITAL. (170 Beds.) RESIDENT SENIOR HOUSE OFFICER (casualty) required.

Applications, giving details of qualifications and experience and names of 3 referees, to be sent to the Group Secretary, Sandford-road, Cheltenham.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (430 Beds.) Required, RESIDENT HOUSE SURGEON (pre-registration) for the Gynæcological (30 Beds) and E.N.T. (16 Beds) Departments. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent as soon as possible.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON required from 23rd April. Senior House Officer or House Officer (Intern) grade. Post recognised for F.R.C.S. or for pre-registration internship. Preference will be given to provisionally registered candidates. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent as soon as possible.

COLCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following posts :—

Essex County Hospital, Colchester (188 Beds)

SENIOR HOUSE OFFICER to Casualty and E.N.T. Departments. Post tenable for 6 months or 1 year. Recognised for F.R.C.S.

Clacton and District Hospital, Clacton-on-Sea (58 Beds)

SENIOR HOUSE OFFICER (Resident Surgical Officer). Post tenable for 1 year.

Applications, with copies of 3 testimonials, to the Group Secretary, 14, Pope's-lane, Colchester, Essex.

COTTINGHAM, near HULL. CASTLE HILL SANATORIUM. (221 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required to work under supervision of Consultant Chest Physician. Residential accommodation available. Group includes Major Thoracic Surgery and Mass Radiography Units and laboratory facilities.

Application forms from Group Secretary, Hull B Hospital Management Committee, De la Pole Hospital, Willerby, E. Yorkshire.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (711 Beds.) SENIOR HOUSE OFFICER to the Obstetric and Gynæcology Department (105 obstetric and 30 gynæcological beds). Post vacant 18th April. Appointment for 6 months, with possibility of renewal for further 6 months. Post recognised for both obstetrics and gynæcology for the M.R.C.O.G.

Applications, giving age, qualifications and experience, and names and addresses of 2 referees, together with recent testimonials, to the Group Secretary, St. Helier Hospital, immediately.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (Acute Children's Hospital of 840 Beds.) Locum Tenens SURGICAL AND ORTHOPÆDIC REGISTRAR required for the period 2nd–16th April inclusive.

Apply, to the Secretary, Queen Mary's Hospital, Carshalton.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (Acute Children's Hospital of 840 Beds.) HOUSE SURGEON (resident) required for 6 months. Applicants must have completed 12 months Pre-registration Service. Position vacant mid-May.

Applications, stating age, qualifications and experience, together with 3 recent testimonials, should be sent to the Group Secretary by 31st March, 1955.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (Acute Children's Hospital of 840 Beds.) HOUSE PHYSICIAN (Senior House Officer). Care of acute medical, rheumatism and poliomyelitis beds. Position vacant end of May.

Applications, stating age, qualifications and experience, with copies of 3 testimonials, should reach the Secretary by 31st March, 1955.

DERBY. CITY HOSPITAL. House Surgeon (pre-registration) or SENIOR HOUSE OFFICER (surgical). The post is recognised for the F.R.C.S. Vacant on 27th April.

Applications, stating full details, together with copies of 2 recent testimonials, to Medical Superintendent.

DRIFFIELD, YORKSHIRE. NORTHFIELD SANATORIUM. (78 Beds.) SENIOR HOUSE PHYSICIAN, vacant now. Offers experience all branches of tuberculosis within Group, including surgery, M.M.R., and clinics. Time for study. Ex-patients welcome. £165 for full residence.

Applications to Group Secretary, Westwood Hospital, Beverley, Yorkshire.

DURHAM. COUNTY HOSPITAL. (116 Beds.) Resident HOUSE SURGEON required immediately in Orthopædics and Casualty. Post recognised for pre-registration purposes. This post offers facilities for good and varied experience in a busy Orthopædic and Accident Hospital which serves a wide mining and industrial area.

Apply, giving age, experience and names of 2 referees, to the Group Secretary, Dryburn Hospital, Durham.

DURHAM. DRYBURN HOSPITAL. (309 Beds.) Applications are invited from fully registered practitioners for the post of SENIOR HOUSE OFFICER in Pædiatrics for a period of 9 months from 1st May, 1955. This post is recognised for the D.C.H.

Applications, with particulars of previous experience, and names of 2 referees, to Group Secretary, Dryburn Hospital, Durham.

DURHAM. DRYBURN HOSPITAL. (309 Beds.) Applications are invited from fully registered practitioners for the post of SENIOR HOUSE OFFICER in General Surgery. This post is vacant now and is recognised under the F.R.C.S. regulations.

Applications, with details of previous experience, and names of 2 referees, to Group Secretary, Dryburn Hospital, Durham.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

(1) SURGICAL REGISTRAR (resident), North Cambridgeshire Hospital, Wisbech. Post provides good training and experience in both general and orthopædic surgery. Appointment for 1 year, renewable for second year.

(2) SURGICAL REGISTRAR, East Suffolk and Ipswich Hospital. Post recognised for F.R.C.S. Appointment for 1 year, renewable for second year.

Applications, stating age, experience and the names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 4th April, 1955. Candidates invited to visit hospital by direct arrangement with Hospital Management Committee Secretary at the hospital.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ORTHOPÆDIC REGISTRAR. East Suffolk and Ipswich Hospital and Ipswich Borough General Hospital. Post provides excellent training in orthopædic surgery. Appointment for 1 year, renewable for second year.

Applications, stating age, experience and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 28th March, 1955. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, East Suffolk and Ipswich Hospital, Ipswich.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. REGISTRAR in E.N.T. Surgery, Norfolk and Norwich Hospital and Jenny Lind Children's Hospital, Norwich. Post recognised for D.L.O. Appointment for 1 year, renewable for second year.

Applications, stating age, experience and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 28th March, 1955. Candidates invited to visit Hospitals by direct arrangement with Hospital Management Committee Secretary. Norfolk and Norwich Hospital.

EAST KILBRIDE. HAIRMYRES HOSPITAL. Junior HOSPITAL MEDICAL OFFICER required now, to work in the Thoracic Surgical Unit (72 Beds) for tuberculous and non-tuberculous lung surgery, with certain duties in the sanatorium wards. The post is resident; salary is on Junior Hospital Medical Officer scale—£775–£50–£1075.

Applications, stating age, nationality, qualifications and experience, with the names of 3 referees, to the Physician-Superintendent, Hairmyres Hospital, East Kilbride.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN (general medicine and dermatology), vacant 23rd April, 1955. This is a recognised pre-registration appointment.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 26th March, 1955.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN, vacant 3rd May, 1955. This is a recognised pre-registration appointment.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 26th March, 1955.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) Locum CASUALTY REGISTRAR required for the month of April, 1955, at above Hospital.

Apply immediately to Medical Director.

FARNBOROUGH HOSPITAL, Farnborough, Kent. (800 Beds.) ORTHOPÆDIC SENIOR HOUSE OFFICER required for 1 year. Deduction for residence £150.

Apply, stating age, qualifications with dates, experience, and naming 3 referees, to the Administrative Officer.

GAINSBOROUGH. JOHN COUPLAND HOSPITAL. (40 Beds.) LINCOLN NO. 1 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT MEDICAL OFFICER at the above Hospital. The Hospital has a number of both medical and surgical beds. Salary is in accordance with Junior Hospital Medical Officer grade of the terms laid down for hospital medical and dental staffs. Married quarters are available.

Applications, giving full particulars, should be forwarded as soon as possible to R. W. HOWICK, Group Secretary.

County Hospital, Lincoln.

GLASGOW NORTH-EASTERN MENTAL HOSPITALS BOARD OF MANAGEMENT require RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER for Gartloch Mental Hospital, Gartcosh, Glasgow. Salary £775–£50–£1075 p.a. Married quarters may be available. Hospital may be seen by appointment with Medical Superintendent.

Applications, stating age, qualifications, training and experience, and names of 2 referees, to be sent to the Secretary and Treasurer, 2154, Gartloch-road, Gartcosh, Glasgow.

GLASGOW. ROYAL HOSPITAL FOR SICK CHILDREN. Vacancies exist for the posts of RESIDENT HOUSE OFFICER in Surgical Pædiatrics at the above Hospital.

Applications should be sent to the Medical Superintendent.

GRIMSBY GENERAL HOSPITAL. Grimsby Hospital MANAGEMENT COMMITTEE. Applications are invited for the post now vacant, of SENIOR HOUSE OFFICER (orthopædic). Locum would be considered.

Applications, with names and addresses of 2 referees, to Hospital Secretary, Grimsby General Hospital.

GRIMSBY GENERAL HOSPITAL. Grimsby Hospital MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER for casualty duties required 8th April, 1955. Resident post. Recognised by Royal College of Surgeons for Final Fellowship examination. Hours: 9 A.M.–6 P.M. Monday–Friday; 9 A.M.–12 P.M. Saturday. The Hospital possesses a well-equipped medical library.

Applications, with names and addresses of 2 referees, to the Hospital Secretary, Grimsby General Hospital.

GUILDFORD GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. E.N.T. REGISTRAR (non-resident) required half-time (see note) at Royal Surrey County Hospital, Guildford.

Application forms obtainable from Secretary, Guildford Group Hospital Management Committee, St. Luke's Hospital, Guildford, to whom they should be returned not later than 1st April, 1955. The Hospital may be visited by appointment (Tel. No. Guildford 2323).

Note: Applicants interested in a full-time appointment jointly with a neighbouring group are invited to write for details.

GUILDFORD. ST. LUKE'S HOSPITAL. Guildford Group HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR (resident or non-resident) at above Hospital. Preference will be given to applicants with higher qualifications. The Hospital may be visited by arrangement direct.

Application forms obtainable from, and should be returned not later than 1st April, 1955, to, Secretary, Guildford Group Hospital Management Committee, St. Luke's Hospital, Guildford.

HALIFAX GENERAL HOSPITAL. (425 Beds.) Junior HOSPITAL MEDICAL OFFICER in Anæsthetics required. Board-residence available.

Applications to Group Secretary, Royal Halifax Infirmary, Halifax.

HERTFORD COUNTY HOSPITAL. (Situated 21 miles from London.) Applications are invited from registered medical practitioners for the appointment of a Whole-time Locum REGISTRAR (surgical). To commence as soon as possible for approximately 1–2 months. Salary £17 10s. per week.

Applications, giving full details, together with copies of recent testimonials or the names of referees, to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (medical) at this Hospital which is approved by the licensing authority for Pre-registration Service. The selected candidate will be required to look after medical and pædiatric cases and may be called upon to give emergency anæsthetics. Post vacant towards the end of April.

Apply, with full particulars, and names of 2 referees, to Group Secretary, Hospital Management Committee Offices, Newmarket General Hospital, Newmarket, Suffolk.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgical) at this Hospital, which is approved by the licensing authority for Pre-registration Service. Post vacant towards the end of April.

Applications, giving full particulars, and names of 2 referees, to the Group Secretary, Hospital Management Committee Offices, Newmarket General Hospital, Newmarket, Suffolk.

KIDDERMINSTER AND DISTRICT GENERAL HOSPITAL. (112 Beds.) HOUSE SURGEON (pre-registration) required immediately at the above Hospital.

Applications, with the names of 3 referees, to the Hospital Secretary.

HITCHIN, HERTFORDSHIRE. LISTER HOSPITAL. Applications are invited for the post of RESIDENT HOUSE SURGEON, vacant 2nd April, 1955. Recognised as pre-registration post and for F.R.C.S.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 recent testimonials, to be sent to the Medical Administrator as soon as possible.

IPSWICH BOROUGH GENERAL HOSPITAL, Heath-road, IPSWICH. (270 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (Fracture and Orthopædic Department). The post, which is now vacant is normally of 1 years duration. It is recognised as part of the necessary surgical experience for the Final F.R.C.S.

Applications, stating age, qualifications and experience, together with recent testimonials to the Hospital Secretary.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. (356 Beds.) Applications are invited for the post of SENIOR HOUSE SURGEON to the Fracture and Orthopædic Department. The post is graded Senior House Officer and is recognised for the F.R.C.S. examinations. The Department has 2 Consultants, about 60 beds, and a large outpatient attendance ; it offers wide experience.

Applications, stating age, nationality, and experience, together with copies of recent testimonials, to Hospital Secretary.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. (360 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications with copies of recent testimonials, to the Hospital Secretary.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (anæsthetics), resident. Post recognised by the Faculty of Anæsthetists.

Applications, stating age, qualifications with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, by 29th March, 1955.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. Pre-registration HOUSE OFFICER for general surgery.

Applications, stating age, nationality, qualifications obtained, with copies of up to 2 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, by 29th March, 1955.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. Pre-registration HOUSE OFFICER for general medicine.

Applications, stating age, nationality, qualifications obtained with copies of up to 2 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, by 29th March, 1955.

LANCASTER MOOR HOSPITAL, Lancaster. (Regional Mental Hospital.) MANCHESTER REGIONAL HOSPITAL BOARD. Applications invited for post of RESIDENT or NON-RESIDENT REGISTRAR (2 vacancies), Male or Female. Preference to candidates who have held house appointments at general hospitals. Unfurnished house in Hospital grounds available for married applicants if required ; furnished quarters for single persons. Hospital recognised for D.P.M., and facilities provided for attending courses of instruction at neighbouring universities. All modern methods of investigation and treatment carried out ; outpatient clinics (4) staffed from Hospital.

Apply Medical Superintendent.

LANCHESTER, CO. DURHAM. MAIDEN LAW HOSPITAL. NORTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital. Appointment for limited tenure in the first instance with prospect of renewal. The Hospital has 72 Beds for the treatment of pulmonary tuberculosis by all modern methods. Salary at the rate of £775–£50–£1075 p.a., less a charge of £150 p.a. for board and lodgings.

Applications, stating age, qualifications, experience, with copies of recent testimonials, should be forwarded to the Group Secretary, Shotley Bridge General Hospital, Consett, co. Durham.

LIVERPOOL. AINTREE HOSPITAL (late Fazakerley Sanatorium). LIVERPOOL AND DISTRICT FAZAKERLEY GROUP OF HOSPITALS MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER (surgical). Applications are invited from registered medical practitioners. The Hospital is for the treatment of pulmonary and non-pulmonary tuberculosis, and is a main centre for thoracic surgery and has an Orthopædic Department. Salary will be in accordance with terms and conditions of service for hospital medical staff.

Applications, endorsed Resident Senior House Officer, to be submitted immediately to the Physician-Superintendent, Aintree Hospital, Fazakerley, Liverpool, 9.

LIVERPOOL, 20. BOOTLE HOSPITAL. House Surgeon required. Recognised pre-registration post.

Apply to Secretary, Walton Hospital, Liverpool, 9.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. REGISTRAR in Anæsthetics required for duties in the Teaching Hospital Group. Terms and conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, experience with relevant dates, and giving 3 names for reference, should be forwarded to the Sub-Dean, The Medical School, Leeds, 2, not later than 31st March, 1955.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. REGISTRAR required for the Radiotherapy Centre. The post will be tenable for 1 year in the first instance and renewable for a second. Terms and conditions of service for hospital medical staff apply.

Applications, giving details of age, qualifications, previous posts with dates, with 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds. 2, by Thursday, 31st March, 1955.

LEEDS REGIONAL HOSPITAL BOARD. Medical ACT, 1950. RESIDENT HOUSE OFFICER posts. Recognised pre-registration House posts will be available for the 6 months commencing 1st May, 1955, in the following hospitals approved under the Medical Act, 1950.

Scarborough Hospital (191 Beds)
1 General Surgical.
1 Surgical (general surgery, E.N.T. and orthopædic).
1 Surgical (obstetric, gynæcology and opthalmology).

County Hospital, York (222 Beds)
2 Surgical (general surgery and gynæcology). Recognised for F.R.C.S.
1 Medical.

City Hospital, York (178 Beds)
1 Medical.

Hull Royal Infirmary and Sutton (218 Beds)
1 General Surgical.
1 Surgical (general surgery and gynæcology). Recognised for F.R.C.S.
1 Surgical (E.N.T.). Recognised for D.L.O.
1 Surgical (ophthalmology). Recognised for D.O.M.S.
1 Medical.

Kingston General Hospital, Hull (398 Beds)
1 Surgical (general surgery, gynæcology, and E.N.T.).

Victoria Children's, Hull (143 Beds) (all posts recognised for D.C.H.)
1 General Surgical.
1 Surgical (general surgery and orthopædic).
1 Medical.
Vacant about 1st June.

Westwood Hospital, Beverley (229 Beds)
1 Surgical (orthopædic). Recognised for F.R.C.S.
1 Medical.

East Riding General, Driffield (247 Beds)
1 Medical.

Clayton Hospital, Wakefield (200 Beds)
1 Surgical (general surgery and orthopædic).
1 Surgical (general surgery, E.N.T. and ophthalmology). Recognised for F.R.C.S.

General Hospital, Wakefield (158 Beds)
1 Medical (general medical and pædiatric). Recognised for D.C.H.

Pinderfields General, Wakefield (663 Beds)
1 General Surgical.
1 Surgical (thoracic).
1 Surgical (gynæcology).
1 Surgical (orthopædic).
1 Medical.
1 Medical (neurology).

General Hospital, Batley (99 Beds)
1 Surgical (orthopædic and ophthalmology), vacant 10th June, 1955.
1 Surgical (general surgery and E.N.T.).

General Hospital, Dewsbury (119 Beds)
1 Medical (general medical, pædiatric and dermatology).
1 Surgical (general surgery and E.N.T.).

Staincliffe General, Dewsbury (314 Beds)
1 Surgical (general surgery, orthopædic and E.N.T.).
1 Surgical (obstetric and gynæcology).

Huddersfield Royal Infirmary (305 Beds)
1 Medical (general medical and dermatology), vacant 1st June, 1955.

Princess Royal Maternity, Huddersfield (60 Beds)
1 Midwifery (recognised by R.C.O.G.).

Royal Halifax Infirmary (301 Beds)
1 Surgical (E.N.T. and ophthalmology).
2 Medical.

Halifax General Hospital (425 Beds)
2 Medical.

Bradford Royal Infirmary (507 Beds)
1 Surgical (general surgery and urology).
2 Surgical (orthopædic and casuality). Recognised for F.R.C.S.

St. Luke's Hospital, Bradford (828 Beds)
1 Surgical (general surgery and plastic). Recognised for F.R.C.S.
1 Medical (pædiatric).

Otley General Hospital (170 Beds)
1 Medical (general medical and pædiatric).

St. James's Hospital, Leeds (1539 Beds)
3 General Surgical (recognised for F.R.C.S.).
1 Surgical (orthopædic).
1 Surgical (plastic).
1 Surgical (urology).
1 Surgical (E.N.T. and ophthalmology).
7 Medical.
1 Medical (geriatric).
1 Medical (pædiatric).
1 Medical (dermatology).
1 Midwifery (recognised by R.C.O.G.).

St. Mary's Hospital, Leeds (216 Beds)
1 Midwifery (recognised by R.C.O.G.).

Seacroft Hospital, Leeds (60 pædiatric and 60 child surgical beds)
1 Surgical (child general surgery, E.N.T. and ophthalmology).
2 Medical (pædiatric).

Harrogate General Hospital (249 Beds)
2 General Surgical (recognised for F.R.C.S.).

Candidates should express, where applicable, their preference for medical, surgical or midwifery posts within the same hospital on the application form.

Candidates wishing to apply for posts at more than 1 hospital should complete a separate form in respect of each hospital.

Application forms can be obtained from the Senior Administrative Medical Officer, Leeds Regional Hospital Board, Park-parade, Harrogate, or from the Dean, School of Medicine, Thoresby-place, Leeds, 2, and should be returned to either of the above-named as soon as possible. Application may be made in advance of results of final examination.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the following REGISTRAR posts :—

Anæsthetics

Halifax Group (resident). 2 main hospitals with aggregate of 300 Beds in the surgical specialties.

Chest Diseases

Castle Hill Sanatorium, Cottingham, East Yorks (220 Beds) (resident).

Obstetrics and Gynæcology

Hull A Group (84 obstetric and 74 gynæcological beds). Recognised for M.R.C.O.G. (resident).

Ophthalmology

St. James's Hospital (22 eye beds—5600 new outpatients annually) and the Public Dispensary, Leeds (non-resident).

Orthopædic Surgery

(*a*) Royal Bath Hospital, Harrogate (40 orthopædic beds). Duties in connection with the Regional Rheumatism Scheme (resident).

(*b*) Woodlands Orthopædic Hospital, Rawdon (100 Beds), and Orthopædic Outpatient Department, Bradford Royal Infirmary. Offers excellent training in all branches of Accident and Orthopædic Surgery (may be non-resident).

Psychiatry

Oulton Hall Hospital, near Wakefield and affiliated Mental Deficiency Colonies (aggregating 780 Beds) (non-resident). Facilities for attendance at the Leeds University will be provided if the successful candidate is studying for the D.P.M.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, should be forwarded to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, not later than 24th March, 1955.

LEEDS, 2. PUBLIC DISPENSARY AND HOSPITAL. LEEDS A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of CASUALTY OFFICER (Senior House Officer) at the above Hospital. The appointment will be for a period of 1 year. Salary in accordance with the agreed terms and conditions of service of hospital medical and dental staffs, with an appropriate deduction in respect of board, lodging, &c.

Applications, stating age, qualifications, experience, &c., together with the names of 2 referees, to be forwarded to the undersigned as soon as possible.

J. FOLKARD, Secretary to the Committee.

Administrative Offices, St. James's Hospital, Leeds, 9.

LIVERPOOL, 14. BROADGREEN HOSPITAL. Applications are invited from registered medical practitioners for appointment as SENIOR HOUSE OFFICER in the Regional Thoracic Surgical Unit, tenable for a period of 6 months from 1st April, 1955. The salary will be £745 p.a., less £130 p.a. in respect of residential emoluments

Applications, on forms obtainable from the undersigned, to be returned completed within 10 days of this advertisement.

H. BLYTHE, Group Secretary.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. Post vacant April, 1955. There are 55 E.N.T. beds and 6 specialist operating sessions each week. Valuable experience is available, and the post is recognised for the purpose of the F.R.C.S. and the D.L.O. Salary will be £745 a year, less £150 a year for residential emoluments.

Applications immediately to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RECEIVING ROOM OFFICER. Post vacant now. Salary £745 a year, with a deduction of £150 a year for residential emoluments.

Applications to the Administrative Officer at the Hospital as soon as possible.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics) required for the South Manchester Group. The post is recognised by the Royal College of Surgeons for the F.F.A.R.C.S. and for the D.A.

Applications, with full details, to the Group Secretary immediately.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. WITHINGTON HOSPITAL, MANCHESTER, 20. The Board invite applications from registered practitioners for the post of MEDICAL REGISTRAR at the above Hospital.

Applications, stating age, qualifications, present post, experience, and names of 2 referees, to be forwarded to the Group Secretary at the Hospital within 7 days of the appearance of this advertisement.

MANCHESTER REGIONAL HOSPITAL BOARD Senior REGISTRAR in Thoracic Surgery firstly at Baguley Hospital, near Manchester (major tuberculosis surgery), and at Park Hospital, Davyhulme, near Manchester (non-tuberculosis surgery). Arrangements may later be made for the successful candidate to work concurrently at the Manchester Royal Infirmary.

Forms of application, obtainable from the Senior Administrative Medical Officer, Cheetwood-road, Manchester, 8, should be returned by 28th March, 1955.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of RESIDENT REGISTRAR in General Surgery. The duties will be with the Stockport and Buxton Hospital Management Committee, resident at Stepping Hill Hospital, Stockport, where the officer appointed will be Resident Surgical Officer.

Applications, stating age, experience, and qualifications, together with copies of 2 testimonials, to be addressed to the undersigned forthwith. H. G. PRICE, Group Secretary.

59B, Shaw-heath, Stockport, Cheshire.

MANCHESTER REGIONAL HOSPITAL BOARD. Salford HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of NON-RESIDENT REGISTRAR in E.N.T. Surgery in the above Group with main duties at Hope and the Royal Manchester Children's Hospitals.

Applications, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Salford Royal Hospital, Salford, 3, before 26th March, 1955.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the appointment of REGISTRAR in Obstetrics and Gynæcology, vacant immediately. Salary at national scale. Initially the appointment will be for 1 year, renewable normally for a second year. The successful candidate will act during the first year as Resident Obstetric Surgeon in the obstetrical branch of the Hospital at Whitworth-street, and during the second year as Resident Surgical Officer in the gynæcological branch at Whitworth Park. The duties include some teaching, the supervision of the work of House Officers and Resident Medical Students, and very considerable clinical responsibility. Candidates must, therefore, have had fairly full previous experience in obstetrics and gynæcology. A higher qualification is not essential.

Forms of application may be obtained from the undersigned. The closing date is 1st April, 1955.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for SENIOR HOUSE OFFICER post. Salary £745 p.a., less £155 p.a. for residential emoluments.

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. REGISTRAR to the Department of Anæsthetics, to commence as soon as possible. Whole-time, non-resident post, tenable for 12 months, renewable. Applicants should preferably possess a higher qualification.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 6th April, 1955.

G. H. TAYLOR, Secretary.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) RESIDENT SENIOR HOUSE OFFICER (pathology) required. Post vacant end of May, 1955.

Forms from Secretary.

MANCHESTER (near). ALTRINCHAM GENERAL HOSPITAL, ALTRINCHAM. (130 Beds.) NORTH AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE OFFICER (surgical).

Applications to Group Secretary, The Hospital, Sinderland-road, Altrincham, Cheshire.

MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Locum SURGICAL REGISTRAR, based at St. Bartholomew's Hospital, Rochester, required immediately for some months. A higher qualification desirable. Resident or non-resident. Salary £17 10s. per week.

Apply, with full details, to Group Secretary, 20, Star-hill, Rochester, Kent.

NEWCASTLE GENERAL HOSPITAL. (847 Beds.) NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. The resident post of SENIOR HOUSE OFFICER (Male), Urological Unit (51 Beds), is now vacant and is tenable for 12 months.

Applications should be addressed to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4, together with 1 copy of 2 recent testimonials.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regional BLOOD TRANSFUSION SERVICE. MEDICAL OFFICER (Junior Hospital Medical Officer grade), whole-time, for a period not exceeding 4 years. Blood Transfusion Service eventually to be accommodated in a new centre at Newcastle General Hospital.

Applications, with names and addresses of 3 referees, to be sent to Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 14 days.

NOTTINGHAM. CITY HOSPITAL. (804 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics), vacant 1st May, 1955. The post is approved for the D.C.H.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (804 Beds.) Applications are invited for the post of GYNÆCOLOGICAL HOUSE OFFICER (recognised for pre-registration purposes) which will be graded Senior House Officer or House Officer in accordance with experience. Recognised for M.R.C.O.G. Post vacant on 1st April.

Applications, stating age, nationality, qualifications, and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners for the post of THIRD CASUALTY OFFICER (Senior House Officer grade). Salary (less £150 emoluments) and conditions of service in accordance with those laid down by the Ministry. Duties to commence on or about 9th April, 1955. This post offers wide experience of casualty work. The staff establishment requires only 1 night in 3 emergency work, and off duty permits time for study for higher examinations.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to—

HENRY M. STANLEY.

NOTTINGHAM GENERAL HOSPITAL. Senior Surgical HOUSE OFFICER required at the above Hospital. Good opportunity for obtaining operating experience in general surgery. Duties to commence on 1st April, 1955. Salary and conditions of service in accordance with the published conditions of the Ministry of Health.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NORTHAMPTON GENERAL HOSPITAL. (485 Beds.) Vacancies 1st April, 1955, for the following :—

2 HOUSE OFFICERS (general surgery). Recognised for F.R.C.S.

HOUSE OFFICER (Department of Anæsthetics). Recognised for D.A.

SENIOR HOUSE OFFICER (Casualty Department). Recognised for F.R.C.S. (Deduction £125 for residential emoluments.)

HOUSE OFFICER (Casualty Department). Recognised for F.R.C.S.

All posts, except those of Anæsthetic House Officer and Casualty Senior House Officer, recognised for pre-registration. 6 months appointments in the first instance.

Applications, enclosing copies of 3 testimonials, as soon as possible to S. G. HILL, Superintendent.

NORTHAMPTON GENERAL HOSPITAL. (485 Beds.) Inquiries are invited concerning ROTATING INTERN posts each of 6 months duration, to commence on 1st April, 1955, in various specialties, on Junior Hospital Medical Officer salary scale and conditions of service. Single accommodation available. Deduction at the rate of £125 a year for residential emoluments. Posts are particularly suitable for candidates who have completed military service and desire further experience before entering general practice or specialising.

Inquiries should be addressed to—

S. G. HILL, Superintendent.

NEWTON ABBOT HOSPITAL. (General Section 65 Beds.) RESIDENT SENIOR HOUSE SURGEON (Male or Female) required approximately 25th March, 1955.

Applications (quoting reference F.364/28), stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay.

PAISLEY AND DISTRICT HOSPITALS BOARD OF MANAGEMENT. ROYAL ALEXANDRA INFIRMARY, PAISLEY. JUNIOR HOSPITAL MEDICAL OFFICER required for General Surgical Unit. 6 months tenure.

Applications to be submitted to Group Medical Superintendent at the above address, immediately.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL HOSPITAL. PLYMOUTH, SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. SENIOR HOUSE OFFICER in General Medicine, vacant 11th May, 1955.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, to be sent to ARTHUR R. CASH, Group Secretary.

7, Nelson-gardens, Stoke, Plymouth.

PONTEFRACT GENERAL INFIRMARY. Resident CASUALTY OFFICER required, graded Senior House Officer. Recognised for Fellowship. Married accommodation available.

Apply Secretary, Great Northern House, Salter-row, Pontefract, Yorkshire.

PONTYPOOL AND DISTRICT HOSPITAL, Pontypool, MON. (116 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER (surgical) required about 1st April. This is the senior resident post and entails duties with the 2 Consultant Surgeons, as well as supervising the other resident staff of 2 House Surgeons and a House Physician. Salary £775–£1075, less £150 board-residence. Excellent experience.

Write, quoting 2 referees, to T. A. JONES, Group Secretary. 64, Cardiff-road, Newport, Mon.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments :—

GYNÆCOLOGICAL HOUSE SURGEON for duties at Queen Alexandra Hospital (50 gynæcological beds), vacant now. Post recognised for M.R.C.O.G. Pre-registration post. At the end of 6 months successful candidate would be offered post at St. Mary's Hospital, Portsmouth (50 obstetric, 40 gynæcological beds). Recognised for M.R.C.O.G. and D.Obst.R.C.O.G.

Royal Portsmouth Hospital

HOUSE OFFICER required Orthopædic Department (104 Beds), vacant now.

Locum CASUALTY OFFICER required (Senior House Officer grade), for 6 weeks from the end of March.

Applications, stating age, experience and qualifications, together with names of 2 referees, should be forwarded as soon as possible to L. C. ROGERS.

35, Grove-road, South, Southsea.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment, vacant now, of REGISTRAR in the Chest Services of the Group for duties at the Portsmouth Chest Clinic and the tuberculosis wards at the Infectious Diseases Hospital and Saint Mary's Hospital, Portsmouth, including experience with a major Thoracic Surgery Unit.

Forms of application may be obtained from the Acting Group Secretary, Portsmouth Group Hospital Management Committee, 35, Grove-road South, Southsea, which should be returned to him, duly completed, on or before 28th March, 1955. Candidates may visit the above Clinic and Hospitals by arrangement with the Acting Group Secretary.

REDHILL. EAST SURREY HOSPITAL, Shrewsbury-road. (139 Beds.) HOUSE SURGEON (Male) required, preferably second or third appointment.

Apply to the Hospital Secretary.

REDHILL. EAST SURREY HOSPITAL, Shrewsbury-road. (139 Beds.) HOUSE PHYSICIAN (Male) required —preferably second or third appointment.

Apply to the Hospital Secretary.

REDHILL COUNTY HOSPITAL, Earlswood Common, REDHILL, SURREY. RESIDENT HOUSE SURGEON. 2 pre-registration posts available April, recognised for F.R.C.S.

Apply immediately to Group Secretary, Earlswood Mount, Redhill (Redhill 3581—Ext. 20).

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER in Pathology required in this large general hospital containing well-equipped laboratory where excellent opportunities exist for gaining extensive experience.

Applications should be sent immediately to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) SENIOR HOUSE OFFICER for the Regional Poliomyelitis Unit (27 Beds) and in general medicine, vacant from 1st May, 1955.

Apply to Medical Superintendent.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE SURGEON (Male), required from 19th April, 1955. (Post not approved for pre-registration purposes.)

Applications should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROSSLYN CASTLE, MIDLOTHIAN. ROSSLYNLEE MENTAL HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER (Locum), Male or Female, required at once for the above Mental Hospital. Some previous psychiatric experience desirable but not essential.

Applications to the Physician-Superintendent, Dr. E. J. C. HEWITT, Rosslynlee Hospital (Tel. Roslin 258).

RYDE, I.W. ROYAL I.W. COUNTY HOSPITAL. Isle OF WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the non-resident post of CASUALTY AND ORTHOPÆDIC OFFICER (Registrar status) which becomes vacant on 1st May, 1955. Salary £850 or £965 according to previous posts held.

Forms of application can be obtained from the Group Secretary, Hospital Management Committee Headquarters, Clatterford House, Carisbrooke, I.W., and should be returned not later than 30th March, 1955.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (general surgery) required. Post vacant April. Hospital recognised for F.R.C.S. examination and post for pre-registration.

Apply, with copy testimonials, stating age, nationality and full details of previous service, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER in Orthopædics vacant shortly.

Applications (2 references) to Group Secretary, Hospita Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER (E.N.T.), vacant now.

Applications (2 references) to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

SWANSEA HOSPITAL, Swansea. Glantawe Hospital MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the appointment of SENIOR HOUSE OFFICER in the Ophthalmic Department of the above Hospital. The post is recognised for the F.R.C.S. (Eng.) and D.O. examinations.

Applications, stating age, qualifications and experience, should be addressed to the Hospital Secretary.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE SURGEON (Orthopædic Department) which is open to pre-registration candidates, and which becomes vacant at the end of April, 1955. The Department has 35 Beds and a large outpatient turnover.

Applications, stating age, nationality, qualifications, experience, and naming 2 referees, to the Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of Locum RESIDENT HOUSE SURGEON. Post vacant from now until 30th June.

Apply, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for the appointment of a SENIOR REGISTRAR in Orthopædic Surgery for duty in Fife. The appointment is subject to the terms and conditions of the National Health Service.

Applications, giving particulars of age, qualifications, and previous experience, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, by 9th April, 1955.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for the appointment of REGISTRAR in Surgery at the Royal Infirmary of Edinburgh. The appointment is subject to National Health Service regulations.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 16th April, 1955.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in Tuberculosis for duties in the Thoracic Unit at Mearnskirk Hospital, near Glasgow, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 16th April, 1955.

SHEFFIELD. CITY GENERAL HOSPITAL. (642 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT MEDICAL REGISTRAR required with duties also at Fir Vale Infirmary. General medical experience would be gained at the City General Hospital and Geriatric experience at Fir Vale Infirmary. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 28th March, 1955, quoting post "B" and giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD. CITY GENERAL HOSPITAL. (642 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR in General Medicine required with some duties also at Fir Vale Infirmary. Post non-resident but consideration given to residence if desired. The post offers, in addition to general medicine (76 Beds), special experience in chronic respiratory disease and studies in pulmonary function. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 28th March, 1955, quoting post "A" and giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD CHEST SERVICE. Sheffield Regional HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (chest diseases) required with duties mainly at the Crimicar Lane Sanatorium, Sheffield. Post becomes vacant 1st April, 1955. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 28th March, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications are invited for the following posts :—

(*a*) NON-RESIDENT SENIOR REGISTRAR in Radiology at the Royal Infirmary/Royal Hospital Units. Candidates should hold a Diploma in Diagnostic Radiology. The appointment is for 1 year in the first instance and will be renewed annually. It has been agreed in principle between the Board of Governors of The United Sheffield Hospitals and the Sheffield Regional Hospital Board that the appointment, if extended to the full period of 4 years, will be divided, subject to satisfactory work and progress, between The United Sheffield Hospitals and a hospital in the Region.

Closing date for applications 31st March, 1955.

(*b*) RESIDENT SENIOR HOUSE OFFICER in Anæsthetics, Royal Hospital. Post vacant.

Applications to be sent immediately.

(*c*) NON-RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER in Ophthalmology, Royal Hospital. Post vacant 16th April, 1955.

Closing date for applications 26th March, 1955.

(*d*) From registered medical practitioner for the resident post of HOUSE PHYSICIAN to the Professorial Unit at the Children's Hospital. Post vacant 1st May, 1955.

Closing date for applications within 10 days of the first appearance of the advertisement.

Applications for the above posts should state age, qualifications and experience, with the names of 3 referees, and be addressed as follows :—

For post (*a*) and (*c*) : The Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

For post (*b*) : The Superintendent, Royal Hospital, West-street, Sheffield, 1.

For post (*d*) : The Superintendent, Children's Hospital, Western Bank, Sheffield, 10.

Copy testimonials may be enclosed for posts (*b*) and (*d*).

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Psychiatry to fill a vacancy in the approved trainee establishment at Oakwood Hospital, Maidstone, Kent. Previous experience in general medicine is desirable. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 2nd April, 1955.

SOUTHEND GENERAL HOSPITAL. Applications are invited for the post of SECOND CASUALTY OFFICER (Senior House Officer grade) with duties in the Fracture and Orthopædic Department. Post vacant about 1st April, 1955. The post is recognised for F.R.C.S.

Applications, stating age, qualifications and experience, with copies of recent testimonials, to reach the undersigned by 24th March, 1955. J. C. FIELD, Secretary.

SOUTHEND GENERAL HOSPITAL. Temporary CASUALTY OFFICER required (Registrar grade) on a month to month basis, to commence 7th May, 1955. Duties chiefly in Casualty Department, which is under the supervision of Consultant in Orthopædic Surgery. Opportunities for work in Fracture Clinics in association with work of Orthopædic Department. Post recognised for F.R.C.S. if held for 6 months.

Applications, stating age, qualifications, and experience, to be sent to the undersigned by 31st March, 1955.

J. C. FIELD, Secretary.

TAUNTON HOSPITAL MANAGEMENT COMMITTEE. TAUNTON AND SOMERSET HOSPITAL. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER (gynæcology—25 Beds ; and obstetrics—40 Beds). The appointment, which is vacant from 20th March, 1955, is for a period of 12 months. The post is recognised for the M.R.C.O.G. Previous experience in gynæcology/obstetrics is desirable.

Applications, stating age, qualifications, nationality, and experience, together with the names of 2 referees, should be forwarded immediately to the Group Secretary, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton.

TORQUAY. TORBAY HOSPITAL. Resident Casualty OFFICER (Senior House Officer status) required 1st April, 1955. There is a complement of 5 Resident House Officers.

Applications (quoting reference F.955/53), stating qualifications, nationality, age, with copy testimonials, to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay.

TORQUAY. TORBAY HOSPITAL. Torquay District HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER (surgery) required. Post recognised for F.R.C.S. There is a complement of 5 Resident House Officers.

Applications, stating qualifications, nationality, age, with copy testimonials (and quoting Ref. F.955/52), to the Group Secretary, Torbay Hospital, Torquay.

WATFORD PEACE MEMORIAL HOSPITAL AND SHRODELLS HOSPITAL, WATFORD. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR required at above Hospitals which may be visited by direct appointment. Post vacant 10th May, 1955.

Application forms obtainable from, and returnable to, the Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by not later than 10 days after the appearance of this advertisement.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (196 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER for a new Casualty Department.

Applications, giving full details of age, qualifications and experience, with copies of 2 testimonials, should be sent to the Administrator.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR (general surgery), non-resident, Morriston Hospital, Morriston, near Swansea.

REGISTRAR (infectious diseases), based Hill House Isolation Hospital, Swansea (130 Beds), to serve Glantawe Hospital Management Committee. Resident.

SENIOR REGISTRAR and REGISTRAR in Psychiatry, Morgannwg Hospital, Bridgend (all modern treatments, active outpatient clinics, Child Guidance Clinic and Psychological Department). Accommodation available.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. RESIDENT SENIOR CASUALTY OFFICER (Male or Female) required. Junior Hospital Medical Officer grade. The Casualty Department offers exceptional opportunities for the treatment and disposal of a large number of cases of wide variety and interest and is closely associated with the Orthopædic Department. The successful applicant will work under the supervision of the Consultant Orthopædic Surgeons.

Applications, with full details and the names of 2 referees, should be forwarded to the Secretary, Royal Albert Edward Infirmary, Wigan, as soon as possible.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (311 Beds.) OBSTETRICS AND GYNÆCOLOGY HOUSE OFFICERS (2) required. Both posts may be pre-registration. Vacant 18th and 26th May respectively. The Hospital is recognised for the D.Obst.R.C.O.G.

Applications, with copies of 2 testimonials, to the Secretary.

WORCESTER (near). POWICK HOSPITAL. Appli-cations are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (resident or non-resident). The post offers experience in all branches of psychiatry, including all forms of modern treatment and outpatient clinics. The Hospital has a high admission-rate, is recognised for the D.P.M., and has associated Child Guidance Clinics and a Mental Deficiency Institute similarly recognised. Arrangements are made for Medical Officers to attend at the Birmingham Medical School for instruction in neurology.

Applications, with full details and the names of 2 referees, to be forwarded to the Medical Superintendent.

WORCESTER. RONKSWOOD HOSPITAL. Resident ANÆSTHETIST (Senior House Officer status) required for post which is recognised by the Faculty of Anæsthetists. Duties cover all specialties. Married accommodation available.

Applications, with names and addresses of 3 referees, to be sent to the Hospital Secretary.

WOLVERHAMPTON GROUP.

New Cross Hospital, Wolverhampton

HOUSE OFFICER (general surgery). Pre-registration post. Vacant now.

Wolverhampton Eye Infirmary (recognised for F.R.C.S. and D.O. examinations)

HOUSE OFFICER, vacant 1st April.

Apply Secretary, The Royal Hospital, Wolverhampton.

YORKSHIRE. EAST RIDING HOSPITAL MANAGE-MENT COMMITTEE.

Westwood Hospital, Beverley, Yorks (229 Beds)

ORTHOPÆDIC HOUSE SURGEON (first, second, or third post). Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S.

Apply to Group Secretary.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD, DUNEDIN, NEW ZEALAND. DEPARTMENT OF SURGERY. ORTHOPÆDIC AND TRAUMATIC UNIT, DUNEDIN HOSPITAL. Applications are invited for the position of SENIOR ORTHOPÆDIC REGISTRAR, to commence duties as soon as possible. The applicant must possess a higher qualification in surgery and have had extensive experience in orthopædic and traumatic surgery. His duties will include the teaching of Medical Students, Nurses and Physiotherapy Students. The appointment is for a minimum of 1 year and tenable up to 3 years, subject to termination by 3 months notice in writing from either side. The salary payable under the Hospital Employment (Medical Officers, Regulations 1952, Amendment No. 1), is £N.Z.806 5s. p.a., rising by annual increments of £N.Z.57 10s. to a maximum of £N.Z.921 5s. p.a., plus cost-of-living bonus of £N.Z.81 p.a. A living-out allowance of £N.Z.179 8s. p.a. is payable in addition to the above salary if non-resident. Travelling expenses are payable as stated in the conditions of appointment. Application forms and further particulars may be obtained from THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, or from the Office of the High Commissioner for New Zealand, 415, Strand, London, W.C.2.

Applications, stating age, qualifications and experience, together with radiological and health certificates, and copies of testimonials, will be received by the undersigned up till 10 A.M. on Monday, 23rd May, 1955.

W. A. WILLIAMSON, Secretary.

Otago Hospital Board, P.O. Box 946, Dunedin, New Zealand.

NEW YORK, U.S.A. THE DOCTOR'S HOSPITAL. Applications are invited for the following posts :—

(1) 2 RESIDENT HOUSE SURGEONS.
(2) 2 RESIDENT HOUSE PHYSICIANS.
(3) 2 RESIDENT HOUSE OBSTETRICIANS.

All to commence on 1st. July. The monthly salary will be $300, with free board and lodging and laundry. Selected applicants will be expected to sign a contract for 1 year. Return passage by boat or plane will be paid for by the Hospital. Only post-registration graduates of British Universities who have done their military service or are exempt from it will be considered. Some previous experience in their subject is required.

Applications, giving details of experience, should be sent together with copies of 2 recent testimonials to : Address, No. 115, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, before April 28th. Further particulars can be obtained through this address.

U.S.A. ST. ELIZABETH HOSPITAL, Elizabeth, N.J., U.S.A. (250 Beds.) Applications are invited to fill vacancies for 2 INTERNS to serve for 1 year. Hospital approved by A.M.A. Intern training being conducted. Salary $100 plus maintenance.

Apply Administrator.

Public Appointments

BIRMINGHAM. CITY OF BIRMINGHAM. Public HEALTH DEPARTMENT. Applications are invited for the temporary appointment of 3 Whole-time MEDICAL OFFICERS in the Maternity and Child Welfare Department to take holiday duty during the summer months, commencing on 2nd May, 1955. The appointments are non-resident and the salary offered is at the rate of £18 4s. 5d. per week. Successful applicants expected to remain, if required, for a period of 6 months.

Application forms obtainable from the Medical Officer of Health, Council House, Birmingham, 3. Completed forms to be returned to him, with copies of 3 testimonials, not later than 28th March.

BUCKS. COUNTY OF BUCKS. Applications are invited from registered medical practitioners holding the qualifications prescribed by the Sanitary Officers (Outside London) Regulations, 1935 and 1951, for the whole-time joint appointment of ASSISTANT COUNTY MEDICAL OFFICER AND DEPUTY MEDICAL OFFICER OF HEALTH for the Borough of Buckingham, the Bletchley, Linslade and Newport Pagnell Urban Districts, and the Buckingham, Newport Pagnell and Wing Rural Districts. Salary within the scale of £996–£1354 p.a. Travelling and subsistence allowances will be paid on the appropriate Council's scale. The appointment is superannuable.

Further particulars and forms of application may be obtained from the undersigned, to whom applications must be delivered by 31st March, 1955.

R. E. MILLARD, Clerk of the Bucks County Council.

County Hall, Aylesbury, March, 1955.

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointments as Appointed Factory Doctor are vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1

District	*County*	*Latest date for receipt of applications*
RADCLIFFE ..	NOTTINGHAM ..	2ND APRIL, 1955
MILBORNE PORT ..	SOMERSET ..	2ND APRIL, 1955
BREAGE	CORNWALL ..	2ND APRIL, 1955

MANCHESTER. CITY OF MANCHESTER HEALTH DEPARTMENT. Applications are invited from registered medical practitioners (Male or Female) for the position of MEDICAL OFFICER (Maternity and Child Welfare) on the permanent staff. Applicants should have obstetric and/or pædiatric experience and will be required to undertake duties principally in maternity and child-welfare clinics. Possession of the D.Obst. R.C.O.G., D.P.H., or D.C.H. qualification will be an advantage. Salary scale £950 rising to £1300 p.a. The appointment is subject to a medical examination and the City Council's conditions of service.

Application forms obtained on request, must be returned to the Town Clerk, Town Hall, Manchester, 2, and not to any member of the Council, within 21 days of the appearance of this advertisement. Envelopes must be endorsed "Medical Officer, Nursing Services Division." Canvassing is prohibited.

DONEGAL COUNTY COUNCIL. Applications are invited for the post of Temporary MEDICAL OFFICER for Lifford District Hospital. The successful applicant will be required to attend at the Hospital 4 hours on 2 days per week and for 2 hours on the remaining days and in emergencies.

Remuneration : £850 (inclusive) p.a., with no rights to private beds or fees of any kind.

Qualifications : Intending applicants should possess the M.Ch. Degree from a recognised University or the F.R.C.S.I. or equivalent, or have at least 5 years satisfactory experience in the practice of the medical profession, at least 3 of which were devoted to surgical work, including the performance of major surgical operations.

The appointment will be for a period of at least 6 months and will be terminable by 2 weeks notice on either side.

Application forms and full particulars of the post may be obtained from the undersigned, with whom completed application forms must be lodged on or before 31st March, 1955.

T. J. MCMANUS, County Secretary.

County House, Lifford, 8th March, 1955.

EAST HAM. COUNTY BOROUGH OF EAST HAM. DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER. Applicants must be medical practitioners not more than 45 years of age with a Diploma in Sanitary Science. Public Health or State Medicine, and considerable clinical and administrative experience in public health and school medical work. Salary £1166 13s. 4d.–£50–£1416 13s. 4d. p.a.

Further particulars and form of application returnable by 31st March, 1955, from Town Clerk, Town Hall, East Ham, E.6.

GLOUCESTERSHIRE COUNTY COUNCIL. Cirencester URBAN COUNCIL, CIRENCESTER, NORTHLEACH AND TETBURY RURAL DISTRICT COUNCILS. Applications are invited for the post of DIVISIONAL MEDICAL OFFICER for the County, MEDICAL OFFICER OF HEALTH for the above-named districts and SCHOOL MEDICAL OFFICER. The appointments, which together are whole-time, involve approximately 2/5ths for each of the first-named appointments and 1/5th for the last named. The salary is in accordance with the Medical Council of the Whitley Council for the health services and is £1441 13s. 4d. p.a., rising by a differing number of annual increments according to the appointment to a salary of £1790. The selected candidate will be required to drive a motor-car, an allowance will be paid in accordance with the Whitley Council scale. The appointment is superannuable and the successful applicant is required to pass a medical examination. Applicants must hold a Diploma in Public Health and in respect of the County Council duties will act under the direction of the County Medical Officer of Health. The appointment will be subject to 3 calendar months notice on either side.

Applications, stating age, qualifications and previous experience, together with the names of 2 persons to whom reference may be made, should reach the Clerk of the East Gloucestershire United Districts Medical Officer of Health Sub-Committee, 5, Dyer-street, Cirencester, not later than 2nd April, 1955.

GUY H. DAVIS, Clerk of the County Council.

J. A. HALL, Clerk, East Gloucestershire United Districts Medical Officer of Health Committee.

5, Dyer-street, Cirencester.

INVERNESS COUNTY COUNCIL. Inverness Town COUNCIL. Applications are invited from registered medical practitioners holding the Diploma in Public Health or similar qualification for the appointment of DEPUTE MEDICAL OFFICER OF HEALTH, Inverness County Council and Inverness Town Council, and the ancillary post of POLICE SURGEON, Inverness Burgh. Experience in public health and school health administration essential. A house will be made available if required. Salary £1100–£1350 p.a., plus £80 p.a. in respect of the post of Police Surgeon, with placing according to qualifications and experience. Conditions of appointment may be obtained from the subscribers.

Applications, with copies of 3 recent testimonials should be lodged with the Medical Officer of Health, County Buildings, Inverness, by 9th April.

County Buildings, Inverness. R. WALLACE, County Clerk.
Town House, Inverness. J. CAMERON, Town Clerk.

LANCASHIRE COUNTY COUNCIL. Registered medical practitioners required for appointment of ASSISTANT DIVISIONAL MEDICAL OFFICERS in areas adjacent to Blackburn, Bolton-Bury, Lancaster, Leigh and Middleton. Possession of D.P.H. desirable. Salary £950–£1300 p.a. Travelling and subsistence allowances where applicable.

Application forms and further particulars from County Medical Officer, Serial 30, East Cliff County Offices, Preston.

PRISON COMMISSIONERS require full-time Medical OFFICERS in Prison and Borstal Service (England and Wales). Work includes general medical attention of all prisoners and inmates. Making psychiatric assessments, the provision of medical and psychiatric reports and giving evidence in court are important aspects of the work. Surgical and Psychotherapeutic Units are established at selected centres. Candidates must have attained age of 28 ; must be fully qualified and registered and should possess sound knowledge of medical and surgical practice ; preference given to those who have post-graduate experience in psychological medicine and possession of D.P.M. considered an advantage. Salary £1500–£75–£1800–£100–£2100 (minimum linked to age 35, minus £50 for each year below that age and plus 1 increment for each year above that age but not exceeding 40). Rates are subject to deduction for posts outside London. Salaries of £1500 p.a. and below attract pay supplement of £35 p.a. Appointments are unestablished in first instance but opportunity for establishment through Civil Service Commission later. Unfurnished quarters when available are provided at moderate rental.

Application forms and regulations from B.Y.1114, Appointments Officer, Ministry of Labour and National Service, 1–6, Tavistock-square, London, W.C.1, returnable by 2nd April, 1955. No original testimonials should be forwarded.

HER MAJESTY'S OVERSEA CIVIL SERVICE. Research BRANCH. WEST AFRICAN COUNCIL FOR MEDICAL RESEARCH. MEDICAL RESEARCH OFFICER required in the Hot Climate Physiological Research Unit, Nigeria, to undertake investigations into Human Physiology with particular reference to climate, work and nutrition. Candidate should be prepared to act for the officer-in-charge on occasion and to travel both in Nigeria and other colonial territories. The Unit is situated 10 miles outside Lagos, where there are good facilities for a varied social life. Candidates should have an honours degree in Physiology, possess medical qualifications registrable in the United Kingdom, and have some experience of teaching and/or research. Appointment can be made on probation for appointment in the Research Branch of Her Majesty's Oversea Civil Service or on temporary contract with gratuity of 15% of salary payable after satisfactory completion of appointment. It is possible that existing superannuation rights could be preserved. Selected candidate will be appointed Medical Research Officer, grade II. Salary £800–£50–£1050 a year plus oversea research allowance of £420 a year. Quarters equipped with heavy furniture are available at a rental of 10% of basic salary. Outfit allowance on appointment £60. Travelling-on-duty allowances payable. Free passages for Officer, wife, and children under 13 years of age on appointment and on leave. Tours of service vary from 12 to 24 months. Leave earned at rate of 1 week for each completed month of duty.

Application forms from Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 197/210/06).

NORTHUMBERLAND. COUNTY OF NORTHUMBERLAND. Combined appointment of AREA EXECUTIVE MEDICAL OFFICER for the North No. 1 and 2 Areas and MEDICAL OFFICER OF HEALTH for the Urban Districts of Alnwick and Amble, and the Rural Districts of Alnwick, Glendale, and Rothbury. Applications are invited from registered medical practitioners for the above combined appointment. The North No. 1 and 2 Areas comprise the County Districts named together with the Borough of Berwick-upon-Tweed and the Rural Districts of Belford and Norham and Islandshires. The salary for the appointment will commence at £1357 3s. 9d. and rise by 3 annual increments of £53 18s. 2d. and 1 of £61 11s. 3d. to £1580 9s. 6d., plus a travelling allowance in respect of a motor-car not exceeding 12 h.p. The person appointed will be required to give his, or her, whole time to the duties of the appointment and must not engage in private practice. The appointment is subject to the provisions of the Local Government Superannuation Acts, to the national conditions of service and to 3 months notice in writing on either side, and the successful candidate will be required to pass a medical examination.

Further particulars are shown on the application form, copies of which may be obtained from the Clerk of the County Council, County Hall, Newcastle upon Tyne, 1, to whom applications must be submitted not later than 29th March, 1955.

NOTTINGHAMSHIRE COUNTY COUNCIL. East RETFORD BOROUGH AND EAST RETFORD RURAL DISTRICT COUNCILS. Applications are invited from registered medical practitioners for the mixed whole-time appointment of ASSISTANT COUNTY MEDICAL OFFICER AND MEDICAL OFFICER OF HEALTH of the East Retford Borough and East Retford Rural Districts. Applicants must have had at least 3 years professional experience since qualifying; be experienced in the duties of Medical Officer of Health, School Medical Officer, and the care of mothers and young children and possess a Diploma in Public Health.

Salaries are in accordance with Awards 2285, 2231 and 2452 of the Industrial Court for Public Health Medical Officers holding mixed appointments, namely:—

(*a*) As Assistant County Medical Officer (23/44ths) £706 5s. p.a.–£32 2s. 1d.–£834 13s. 4d. (on scale £1100–£50–£1300, plus loading in accordance with Spens Formula).

(*b*) As Medical Officer of Health, East Retford Borough (8/44ths) £281 16s. 4d.–£9 1s. 10d.–£318 3s. 8d. (on scale £1450–£50–£1650, plus 8/44ths of £100).

(*c*) As Medical Officer of Health, East Retford Rural District (13/44ths) £457 19s. 1d.–£14 15s. 6d.–£517 1s. 1d. (on scale £1450–£50–£1650, plus 13/44ths of £100).

Application forms and conditions of appointment are obtainable from my office, and applications should reach me by 15th April, 1955. Canvassing disqualifies.

A. R. DAVIS, Clerk of the County Council.

Shire Hall, Nottingham.

BERMUDA. A vacancy will occur in June for a PSYCHIATRIST to take charge of a Mental Hospital of 150 Beds, advise on schools and other Government responsibilities. Consulting private practice permitted. Specialist qualifications and experience essential, higher medical qualifications desirable. Salary £2000. No income-tax.

Apply Director of Health Services, Bermuda.

THE MEDICAL SERVICE OF THE ROYAL NAVY

VACANCIES FOR MEDICAL OFFICERS

Candidates are invited for Short Service Commissions of 4 years, on termination of which a gratuity of £600 (tax free) is payable. Ample opportunity is granted for transfer to Permanent Commissions on completion of 1 year's total service. Officers so transferred are paid instead a grant of £1500 (taxable).

All entrants are required to be British subjects whose parents are British subjects, to be medically fit, and to pass an interview.

Full particulars from the Admiralty Medical Department, Queen Anne's Mansions, St. James's Park, London, S.W.1.

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

SPEKE ESTATE, LIVERPOOL. Applications invited in connection with establishment of Medical Practice on Corporation Housing estate. There is no list of patients. Accommodation on the estate will be available. Apply on Form E.C.16A not later than 9th April, 1955, to—

J. G. DONCASTER, Clerk of the Liverpool Executive Council. 36, Princes-road, Liverpool, 8.

Hospital Services: Non-Medical Appointments

HERTFORD COUNTY HOSPITAL, Hertford, Hertfordshire. (173 Beds. 20 miles from London.) Applications are invited for the post of MEDICAL LABORATORY TECHNICIAN who must be qualified and well experienced in pathological histology. Whitley Council salary and conditions of service.

Apply, giving details of age, qualifications, experience, and names of 2 referees, to the Hospital Secretary.

Miscellaneous

To non-professional posts the Notification of Vacancies Order 1952 applies.

Plastic Surgeon wanted, well qualified and trained, who would be interested in immigrating to the United States and taking out citizenship papers. To be associated with a large mid-western plastic surgery Clinic. Guaranteed minimum of $10,000 per year net. For right person, $25,000 net income with 2–3 years is assured. Must spend 6 months in Rotating Internеship to fulfil requirements for State Laws. Private practice devoted entirely to plastic surgery—growing rapidly. Senior partner retiring. Write all particulars, including references and type and extent of general surgical training and when you would be available.—Address, No. 105, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

British Guiana Sugar Producers' Association offer interesting opportunity to young Medical Officer to act for 1 year commencing August for 3 of their permanent sugar estate doctors due U.K. leave. Salary £1500 p.a. Rent free accommodation. Paid passages. Car allowance.—Apply in writing only to the Secretary, BOOKERS SUGAR COMPANY LIMITED, 37/41, Gracechurch-street, London, E.C.3.

Medical Officer required for Middle East by large Oil Company; preference for those with overseas experience and some knowledge of tropical work. Age about 35 and preferably single. Emoluments total over £2000 p.a.; paid home leave after 2 years; pension fund.—Write, quoting No. 379 to BOX No. 8472, c/o CHARLES BARKER & SONS LTD., 31, Budge-row, London, E.C.4.

M.A., M.D., requires part-time literary work, e.g., preparation of medical literature for pharmaceutical firm.—Address, No. 114, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Wimpole-street. Consulting-room in pleasant, well-run house available for Medical Consultant or private dental practice. £300 p.a. inclusive.—Tel.: WELbeck 0476.

Becoming vacant. Drs. serviced, equipped, well-furnished Consulting-rooms. Use of small Surgery. Terms arranged.—14, Herbert House, Herbert-crescent, Knightsbridge (SLOane 8014).

Well-known, highly respected pharmaceutical house with large annual business seeks products with successful backgrounds in country of origin for production and sale in U.S.A. under licensing, royalties, or outright purchase of patents. All correspondence held in strict confidence.—Address, No. 116, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Austin. The New Show Models A.30, A.40, A.50 and A.90. Limited number of deliveries to proven essential users.—Application form, brochures, easy terms from Austin House, 140–144, Golders Green-road, Golders Green, London, N.W.11.

A car for your needs—we can supply new: Standards 8 and 10; Zephyr Convertible; T.R.2; Riley 1½ litre; Morgan Coupe and others.—BASIL ROY LTD., 161, Gt. Portland-street, W.1 (LANgham 7733).

Typewriting and Duplicating. First-class work at moderate prices by experienced medical typists.—SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM. 5329/0504).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE, LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141), who are specialists in this kind of work.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Microscopes. Highest prices paid for good modern types. Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

The British Journal of Medical Hypnotism. Quarterly, £1 1s. p.a.—Orders to the Publishers, 4, Victoria-terrace, Hove, 3, Sussex.

Salmon and sea-trout fishing. Rods available on beat stretch of Avon (main tributary of the Spey). private water with most comfortable accommodation in country house on riverside. Mid-April to end July. Also rough shooting available from mid-September.—Apply, Secretary, Kylnadrochit Lodge, Tomintoul, Banffshire.

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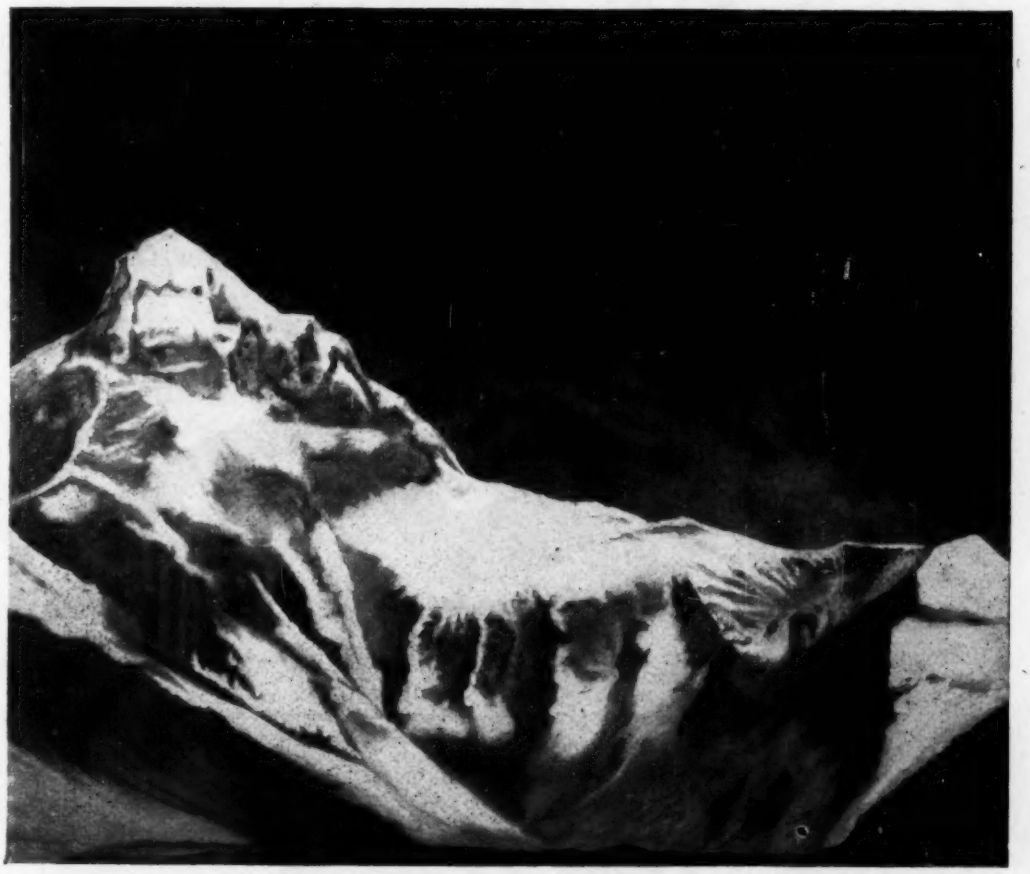

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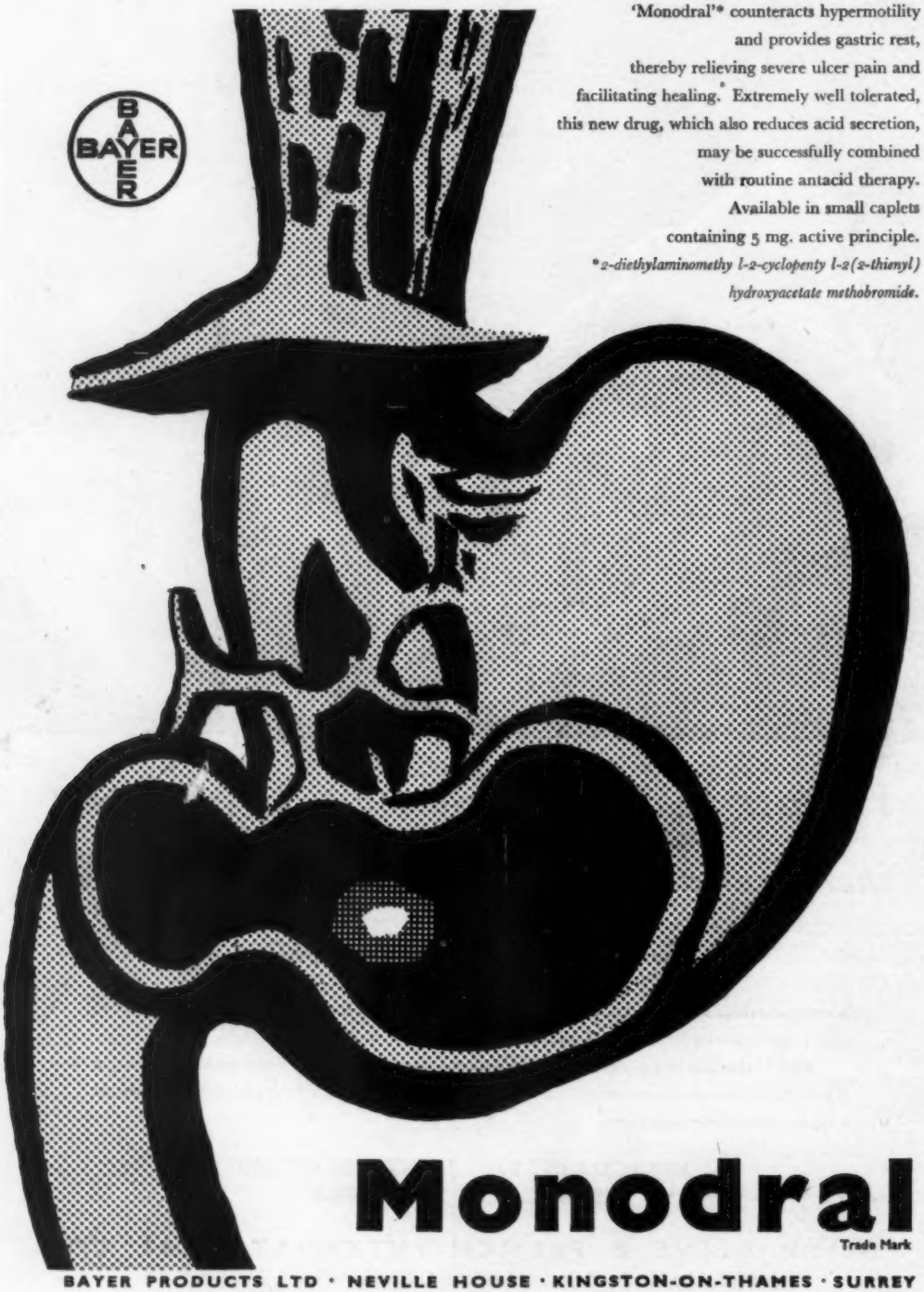

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